4K 96-50

AN OVERVIEW OF THE GROUNDFISH FISHERY IN THE CENTRAL AND WESTERN GULF OF ALASKA

By

David Jackson,

Daniel Urban,

Robert Gish,

and

Gail Smith

Regional Information Report[1] No. 4K96-50

Alaska Department of Fish and Game
Commercial Fisheries Management and Development Division
211 Mission Road
Kodiak, Alaska 99615

October 1996

[1] The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished division reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Commercial Fisheries Management and Development Division.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the review and edit of this report by Leslie J. Watson, Dave Prokopowich, and Al Spalinger. Elaine Dinneford and Bruce Simonson provided valuable data analysis.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES Continued

LIST OF APPENDIX

INTRODUCTION

Groundfish harvests in the Gulf of Alaska (GOA) are primarily managed by National Marine Fisheries Service under guidelines developed by the North Pacific Fishery Management Council (NPFMC). Authorization for the control of resources from 3-200 miles came from the Magnuson Act passed by the United States Congress in 1976.

The federally described Central and Western Gulf of Alaska includes Pacific Ocean waters within the 200 mile U.S. Exclusive Economic Zone (EEZ) of the United States between the longitude of 147°W and 170° W; excluding Prince William Sound (Figure 1). The State of Alaska has groundfish areas described for territorial waters within federal designations which are named the Cook Inlet Area, Central Gulf of Alaska Area and the Western Gulf of Alaska Area. Districts within the Central Gulf of Alaska area are named North Gulf Coast, Kodiak, and Chirikof (Figure 2).

The major commercial groundfish species harvested include pollock, Pacific cod, flounders, rockfishes, sablefish, and Atka mackerel. Except where the State of Alaska manages separate groundfish harvest quotas specified in Alaska Administrative Code 5 AAC 28, all groundfish catches in waters of the State of Alaska, including internal waters are managed against Total Allowable Catch (TAC) specifications set by the NPFMC. The total groundfish harvest from the Gulf of Alaska during 1995 was 216,000 metric tons of all species (Appendix 1).

The purpose of this report is to give the Alaska Board of Fisheries (BOF) an overview of the groundfish fishery in the Central and Western GOA.

MANAGEMENT

The Gulf of Alaska Fishery Management Plan (FMP) adopted by the NPFMC designates four categories of finfish and invertebrates for management purposes; target species, other species, prohibited species and non-specified species. The FMP recognizes single species and species complex management strategies. Single species management is recommended for stocks that are easily targeted by the harvesting sector, and for which minimal mixing of other species occurs in the targeted catch. In the Gulf of Alaska, Pacific cod, pollock, sablefish, Pacific Ocean perch, northern rockfish, flathead sole, rex sole, and arrowtooth flounder have each been managed as single species fisheries. Other groundfish are grouped for management purposes. Catch limits for target species are annually specified by the NPFMC and described as Total Allowable Catch (TAC) (Appendix 2).

The Alaska Department of Fish and Game (ADF&G) has issued emergency orders at the beginning of each year modifying commercial fishing seasons in the territorial waters of Alaska in the Central Gulf, Western Gulf, and Bering Sea-Aleutian Islands areas. State commercial groundfish seasons are set to coincide with federal inseason adjustments to the groundfish fishery

in adjacent waters of the EEZ, with the exception of the statewide commercial lingcod fishery and rockfish fisheries in the North Gulf District. Separate state water fisheries for sablefish in the North Gulf District and in the Aleutian Islands area were prosecuted in 1995 and 1996. Fishery statistics from the onshore processing segment of the industry are collected by ADF&G and reported on fish tickets, which detail catch, effort, and location information. National Marine Fisheries Service (NMFS) uses weekly processor reports and observer information as the basis for management decisions.

PACIFIC COD

Historical Background

The Pacific cod (*Gadus macrocephalus*) occurs on the continental shelf and upper slope waters throughout the Gulf of Alaska, Aleutian Islands, and Bering Sea. Fishery statistics compiled by National Marine Fisheries Service show landings from the Gulf of Alaska beginning in 1964 with the highest harvests occurring during the early 1990's. The average catch since 1977 has been approximately 38,000 mt (Appendix 1).

ADF&G fish tickets show a peak harvest from the Central and Western Gulf of Alaska in 1991 at over 176 million pounds of Pacific cod (Table 1). These records reflect more than 90% of the harvest due to an onshore processing allocation directed by the NPFMC. The harvest of cod from state waters has generally increased in recent years. The catch in state waters from 1994 to 1996 has comprised over 20% of the total cod harvest from both the Central and Western areas. The catch by statistical area from 1990-1995 displayed in Figure 3 shows the highest harvests near Kodiak, Sand Point, and King Cove.

Some advisory committee proposals on groundfish management address resource allocation among areas similar to salmon management areas. The percentage of Gulf of Alaska state water Pacific cod that was harvested from each salmon area is shown in Tables 2 & 3, except the Alaska Peninsula area which was divided at the longitude of Scotch Cap Light into an additional Eastern Aleutian area. For the years 1989 - 1996 Kodiak produced 72% of the state water Central Gulf harvest, while Cook Inlet waters produced 19% and Chignik 8%. State water harvest from the Western Gulf has primarily been taken south of the Alaska Peninsula with 81% of the catch over 8 years. Nineteen percent has come from the Eastern Aleutians.

Multiple gear types are used to exploit cod. Trawl, longline, and pots have been the principal components with trawlers accounting for the majority of gulf cod landings. The use of pot gear has increased notably in recent years, and accounted for 24% of the landings in 1995 (Table 4). Beginning in 1993, the majority of cod landings from state waters of the Central and Western Gulf were made from pot gear. Seventy-three percent (73%) of the Central Gulf state water harvest was caught by pot gear during 1995 (Table 5). In the Western Gulf, 45% of the harvest was caught by pot gear during 1995 (Table 6).

1996 Fishery

The Pacific cod fishery opened to fixed gear on January 1, 1996 with trawl gear allowed beginning January 20. TAC specifications totaled 18,850 metric tons for the Western Gulf and 42,900 metric tons for the Central Gulf. Inshore processors were allocated 90% of the harvest. Halibut bycatch rates were moderate for hook-and-line as well as trawl gear in 1996; PSC limits on halibut did not affect fishing time for these gear types. The Western Gulf closed to all gear types for the inshore sector on March 3 while the offshore sector closed on March 9, 1996. In the Central Gulf, the offshore sector closed March 13, and the inshore component closed on March 18. At the time of the closure announcements, NMFS had estimated that a sufficient amount of cod TAC would be available as bycatch for the remaining groundfish and halibut fisheries. After processor reports were fully examined, it was determined that the target cod harvest had exceeded allowable biological limits. The status of the Pacific cod fishery was then changed to a PSC only fishery on May 5. All cod encountered in other fisheries after that time had to be discarded. Current harvest totals through October are 19,669 mt from the Western Gulf and 45,544 mt from the Central Gulf. Final specifications for 1997 groundfish catch limits and overfishing levels are yet to be determined by the NPFMC. Preliminary Pacific cod catch limits have been set at 15,080 mt for the Western Gulf and 34,320 mt for the Central Gulf, a 30% reduction from the previous season.

POLLOCK

Historical Background

Walleye pollock (*Theragra chalcogramma*) is a semidemersal fish that occurs throughout the North Pacific Ocean. Major exploitable concentrations are found in the Central and Western Gulf of Alaska, and are harvested almost entirely by trawl gear. Initial landings were made in 1964. The foreign fleet effort began in the early 1970's and continued until the onset of joint-venture operations in the mid-1980's. The domestication of the pollock fishery proceeded rapidly and was complete by 1988. The highest harvest occurred during the joint-venture years with landings totaling over 307,000 mt in 1984 (Appendix 1). Annual catches have declined since 1986 to an average of less than 90,000 mt per year. Fish ticket records show pollock harvests have ranged from 140 to 240 million pounds during the 1989 - 1995 period from waters of the Central and Western Gulf of Alaska (Table 7). The percentage of pollock harvests from state waters have increased in recent years and accounted for over 30% of the total harvest for the past two years.

1996 Fishery

The Central and Western Gulf of Alaska pollock TAC was divided among three time periods and three subunits (areas 610, 620, and 630). TAC specifications totaled 25,480 metric tons for the Western Gulf of Alaska (area 610), and 26,520 metric tons for the Central Gulf (areas 620 and 630). Seasonal allocations were set at 25% beginning January 1, 25% beginning June 1, and

50% beginning September 1. Although the first period allocation began January 1, trawl gear could not be used until January 20. Fisheries were generally of short duration, lasting from 8 ½ days in area 630 to 5 weeks in area 620 (Table 8). The 1996 harvest from the Central and Western Gulf was about 52,000 mt (Table 9).

Stock Status

Gulf of Alaska pollock stocks are low compared to levels observed in the early 1980's. However, the 1994 year class of pollock appears to be at a level well above average recruitment. The preliminary specifications for the 1997 TAC are 40% higher than the previous year with a total allocation of 78,000 mt.

ROCKFISH

More than 30 rockfish species occur in Gulf of Alaska waters. For commercial purposes, the NPFMC has divided these species into three management assemblages based on their habitat and distribution: demersal shelf rockfish, pelagic shelf rockfish, and slope rockfish. The slope assemblage, which has accounted for the majority of landings, has been further divided into four subgroups with individual TAC's: Pacific ocean perch (POP), shortraker/rougheye rockfish, northern rockfish, and other slope rockfish.

Historically, the Pacific Ocean perch was the most abundant rockfish in the region and was heavily targeted by the USSR and Japan in the early 1960's. Catches peaked in 1965 when a total of nearly 350,000 mt was landed (Appendix 1). The domestic fishery gained importance after 1985 when foreign trawling was prohibited. The 1996 harvest of POP was the highest harvest since the mid 1970's with a Gulf-wide catch of more than 8,200 mt. Northern rockfish are also targeted by the trawl fleet, with a harvest of about 3,000 mt in the Central Gulf during 1996.

The demersal shelf rockfish group (comprised of eight species) and shortspine thornyheads (*Sebastolobus alascanus*) are generally fished offshore by both trawl and longline gear. Contributions to the annual Gulf of Alaska groundfish harvest totaled 1,860 mt in 1994 (Appendix 1).

The most abundant rockfish species found in state waters is the black rockfish *(Sebastes melanops*). This fish is currently grouped by the NPFMC into the pelagic shelf rockfish assemblage which also includes dusky, yellowtail, widow and blue rockfish. These fish typically exhibit a midwater schooling behavior.

Gulf-wide, the dusky rockfish catches by trawlers have been the predominant species taken in the pelagic shelf assemblage averaging 3,000 mt from 1991 to 1995 (Appendix 1). Beginning in 1991 a small boat jig fishery for near-shore black rockfish expanded, with primary fishing efforts near the town of Kodiak and along the outer Kenai Peninsula coast. The harvest was approximately 1.0 million pounds (Table 10). Vessel effort increased in 1995, along with an

expansion of effort in areas to the west along the Alaska Peninsula (Figure 4). The harvest totaled nearly 900,000 pounds in 1995, approaching the peak harvest in 1991. The fishery straddles the 3 mile territorial sea boundary and occurs in both state and federal waters. The North Gulf District Rockfish Management Plan was adopted by the Board of Fisheries in 1993 to regulate fisheries along the outer Kenai Peninsula. In that same year, fishermen in the Kodiak area were alerted to concerns of the ADF&G staff for localized depletion on fishing grounds near town that had been heavily exploited in 1991.

Expansion of the nearshore jig fishery has raised concerns that overharvesting of this species may be occurring. For several reasons it appears the present federal management scheme is not effective in limiting harvest. First, black rockfish and an associated dark-phase dusky rockfish are not well accounted for in NMFS assessment techniques. In contract, biomass estimates for the pelagic shelf group are largely comprised of only the light-phase dusky rockfish, which are abundant in the federal triennial trawl surveys. Secondly, the relatively high TAC's have not been achieved despite the fact that fishing has remained open year round on all species in the group. When the guideline harvest was reached in state waters off the Kenai Peninsula in 1995, jig fishermen apparently moved their operations outside of 3 miles and continued fishing in the "unregulated" federal zone (SAFE 1996). The NPFMC Gulf of Alaska groundfish plan team is currently considering a groundfish plan amendment to remove dusky rockfish from the pelagic assemblage and transfer management authority for the remaining species to ADF&G in both state and federal waters.

As was the case in 1995, vessel effort in the 1996 black rockfish fishery increased in the Central and Western Gulf, with expansion of new fishing areas near the Semidi Islands. Through October 6 the current harvest is 475,000 pounds taken by 85 vessels.

FLATFISH

The major flatfish species harvested in the Gulf of Alaska, excluding halibut, are arrowtooth flounder, flathead sole, rock sole, rex sole, Dover sole, yellowfin sole, and starry flounder. Catches by foreign vessels were around 15,000 mt per year prior to 1981 (Appendix 1). Beginning in 1988, only domestic fleets could harvest flatfish and the catch climbed to 38,000 mt in 1993. Trawl gear has accounted for almost all landings. Arrowtooth flounder comprises more than half the catch but the fishery primarily targets rock, rex, and Dover sole. The flatfish resource remained moderately harvested in 1994 as the shallow-water, deep water, flathead sole, rex sole, and arrowtooth flounder were harvested at 11%, 31%, 7%, 31%, and 10% of the allowable biological catch apportionment, respectively (SAFE 1996). The Shallow water flatfish complex includes rock sole, yellowfin sole, starry flounder, butter sole, English sole, Alaska plaice and sand sole. Deep water flatfish includes Dover sole, Greenland turbot and deepsea sole. Most of the harvest during the period 1990-1995 came from statistical areas on the east side of Kodiak Island (Figure 5). Trawl closures implemented due to attainment of halibut prohibited species caps were the major factor limiting these fisheries. The 1996 harvest of flatfish in the Central and Western Gulf was approximately 35,000 mt through October 10, 1996

(Table 11.). Additional catches are anticipated as more halibut bycatch became available to the trawl fleet after October 1, 1996.

State-waters catches of flatfish have been limited by gear restrictions, with the majority of state waters in the Central and Western Gulf of Alaska being closed to trawling with non pelagic gear (Figure 6). Areas left open to non pelagic gear around Kodiak include the West side and bays along the Alaska Peninsula. Smaller, state water open areas have been approved by the Board of Fisheries in the South Peninsula area near Castle Rock and Sanak Island. The Central Gulf state water harvest of shallow water flatfish climbed to 1.7 million pounds in 1995 (Table12). Twelve percent (12%) of the flathead sole catch was also taken from Central Gulf state waters in that year (Table13).

SABLEFISH

Sablefish has been harvested since the early 1900's in the Gulf of Alaska. Annual catches averaged about 1,500 mt from 1930-1950 but increased to a record harvest of 37,500 mt in 1972 when the Japanese longline fleet began fishing off of Alaska. The fishery was restricted entirely to the domestic fleet beginning 1985 with a peak catch of 29,903 mt in 1988. Harvests declined after that time while vessel participation increased, culminating in the institution of individual fishing quotas beginning in 1995. Stocks have declined since the late 1980's to a TAC of 17,080 metric tons in 1996 and a preliminary 1997 TAC of 11,620 mt for the GOA. Fish ticket records show slightly more than 10 million pounds of sablefish taken from the Central and Western Gulf in 1994 and 1995 (Table 14). Of that, about 1% was taken from state waters. ADF&G has not allowed a directed fishery for sablefish in state waters from Kodiak to Scotch Cap Light due to low stock abundance and historically small harvest. Moreover, ADF&G survey data indicates that juvenile sablefish predominate the nearshore areas.

Due to deeper nearshore waters, sablefish are generally more abundant in state waters around the Aleutian Islands and along the Kenai Peninsula. The department has managed non-IFQ sablefish harvests in those areas during 1995 and 1996. The catch was approximately 400,000 pounds from both areas in 1996.

ALEUTIAN ISLANDS STATE WATER SABLEFISH FISHERY

Introduction

The Aleutian Islands Area for sablefish management encompasses all territorial waters of the Bering Sea south of the latitude of Cape Sarichef (54° 36' North latitude), and of the Pacific Ocean west of the longitude of Scotch Cap Light (164° 44' West longitude). The area includes all of the state groundfish management area of the Bering Sea - Aleutian Islands Area south of

Cape Sarichef and part of the Western Gulf of Alaska Area from Scotch Cap Light to 170° West longitude.

In 1995 the National Marine Fisheries Service implemented an Individual Fishing Quota (IFQ) system for the harvest of sablefish in federal waters. A determination from the Department of Law stated that the harvest of sablefish in the state waters of Alaska could not be limited to only IFQ fisherman. A fishery for sablefish was established in areas of the state where the historical harvest of this species was of sufficient quantity to allow for a manageable fishery. The Aleutian Islands Area (as defined above) is the only area in the Westward Region in which such a fishery could be established.

A harvest quota of 400,000 pounds was established for sablefish in the Aleutian Islands Area for the 1995 season. The quota was based on the average harvest from this area for the previous four years. The quota was subsequently reduced in 1996 to 270,000 pounds based on the 1995 National Marine Fisheries Survey which showed sablefish stock reductions in the Bering Sea - Aleutian Islands Area of 30%, and of 15% in the Western Gulf of Alaska Area.

1995 Fishery

The 1995 sablefish fishery in state waters of the Aleutian Islands opened March 15, concurrent with the IFQ fishery in federal waters. The first delivery and greatest number of deliveries occurred in May. Both IFQ and non-IFQ fisherman participated throughout the fishery. Fishing effort, in terms of deliveries per month, remained relatively constant from June to the regulatory closure on November 15.

A total of 36 vessels made 60 deliveries for a season harvest of 272,320 round pounds. Average exvessel price per pound in Dutch Harbor was $2.96 per pound dressed weight; the estimated total value for the 1995 sablefish fishery was over $500,000. Eight non-IFQ fisherman made 30 deliveries for 167,164 pounds, or 61% of the harvest. There were 28 IFQ fisherman which made 30 deliveries for a total of 105,156 pounds, or 39% of the harvest. Three catcher-processors participated in the fishery, two of which had IFQ shares.

1996 Fishery

The 1996 Aleutian Islands sablefish fishery opened on March 15, concurrent with the IFQ fishery in federal waters. Fishing effort started immediately and the first deliveries occurred in late March from both IFQ and non-IFQ fisherman. Effort increased during the 1996 season in both harvest and deliveries per month as compared to 1995. The fishery was closed by emergency order on July 26.

A total of 24 vessels harvested 294,384 round pounds. There were 48 deliveries during the 1996 fishery. Average exvessel price per pound in Dutch Harbor was $2.54 dressed weight, estimated fishery value was $470,000. Six non-IFQ and 18 IFQ fisherman participated in the fishery, they made 28 and 20 deliveries, respectively. Non-IFQ fisherman delivered 203,844 pounds which was 69% of the harvest; IFQ fisherman delivered 90,540 pounds, or 31% of the harvest. Five catcher-processors participated in the fishery, three of which had IFQ shares.

Stock Status

The harvest of sablefish in the Aleutian Islands Area has decreased in recent years. The National Marine Fisheries Service annual longline survey shows a continuing decline in the number of sablefish in the area covered.

ATKA MACKEREL

Atka mackerel (*Pleurogrammus monopterygius*) are found throughout the Gulf of Alaska from the Kamchatka Peninsula to Southeast Alaska, with primary concentrations in Aleutian Islands area. An Atka mackerel population existed in the GOA from Kodiak to the Shumagins during the early 1980's and was the focus of a large foreign fishery. Following the intense exploitation, the stock declined precipitously and the fishery was closed.

Atka mackerel stock abundance has improved in the Western Gulf and Aleutian Islands, with targeted domestic fisheries beginning in 1990. The fishery in the Western Gulf was open for a period of 2 days in 1996 with a harvest of 1,300 mt. The Eastern Aleutian Islands fishery harvested 27,000 mt in 35 days of fishing time during 1996. Atka mackerel was placed on bycatch limits throughout the year in the Central portion of the Gulf for all of 1996 and no targeted fishery allowed. For the period 1990-1995, approximately 2% of the harvest has come from state waters. Fishing effort has concentrated in the Amukta and Seguam Passes, but has extended throughout the Aleutians (Figure 7).

RESOURCE ASSESSMENT

Each Fishery Management Plan (FMP) established by the North Pacific Fishery Management Council is required to have a stock assessment and fishery evaluation (SAFE) report prepared and reviewed annually. The SAFE reports are compiled by a Plan Team of scientists at NMFS Alaska Fisheries Science Center (AFSC) and the Alaska Department of Fish and Game. Contributors to the report summarize the best scientific information available on the past, present and projected future condition of the stocks under federal management. National Marine Fisheries Service conducts a triennial bottom trawl survey which is the basis for stock assessment of Gulf of Alaska groundfish resources. Groundfish populations are also evaluated using commerical fishery data such as total catch and age composition. A variety of stock assessment tools are used to characterize abundance trends. For example, the pollock model integrates annual hydroacoustic data with the triennial bottom trawl data to determine annual pollock biomass. Longline surveys are the primary assessment tool for sablefish. NMFS biomass estimates are generally based on the entire range of the species, often calculated with depth stratification. This includes state waters. As an example, the 1993 NMFS bottom trawl survey had nearly 70 hauls or 11% of their effort in state waters . Survey catches of cod from 1993 are shown in figure 8.

The Alaska Department of Fish and Game conducts annual bottom trawl surveys in the nearshore areas of the Central and Western GOA (Figure 9). The annual ADF&G survey is focused on

soft, smooth ocean floor with the goal of estimating the population trends of Tanner crab and red king crab. Groundfish are captured incidentally, but are a source of information on relative population abundance. The highest survey catches of Pacific cod and pollock in 1995 came from the Chignik District (Tables 15 and 16) Recent survey catches of Pacific cod, pollock, rock sole, yellowfin sole, flathead sole, arrowtooth flounder are shown in figures 10,11 and 12.

CATCH BY VESSEL SIZE

Groundfish resources are harvested by more than 1,000 fishing vessels in the Central and Western Gulf of Alaska. Pacific cod harvest by vessel size class from the Central and Western Gulf is shown in figure13. Smaller vessels predominate the fishery near the Shumagin Islands. Overall, 45% of the Pacific cod harvest is taken using vessels 60 feet or less (Table 17). In state waters the percentage of harvest by the smaller size class is 70% (Table 18)

Pacific cod pot fishing is more prevalent around Kodiak Island, especially with smaller boats (Figure 14). The pot caught Pacific cod taken by the smaller size class was 56% overall and 66% in state waters. Pacific cod longline fishing contributed 11% of the total harvest in the Central and Western Gulf. Smaller vessels were used primarily near Kodiak and the outer Kenai Peninsula only (Figure15). About two-thirds of the total cod harvest is taken with trawls. Small trawlers are an important component throughout the Gulf, but especially important near the Shumagins (Figure16). The Pacific cod jig gear fishery has been very small in the Gulf of Alaska, with most (97%) of the vessels less than 61′ in length. (Figure17). Sablefish resources are harvested equally by vessels 60′ or less and vessels >60′, but very little of that effort occurs in state waters (Figure18).

The pollock fishery is dominated by midsize trawlers (61′-125′), which account for 80% of the harvest during the 1993-1995 period. Twenty-six percent (26%) of that catch came from state waters. Trawlers less than 60′ are common along the western Alaska Peninsula (Figure19). Flatfish resources are principally taken by mid-size trawlers. However, the largest vessel class (>125′) harvests 17% and 24% of the flathead and rex soles (Figures 20 and 21). Small trawlers harvested 10% of the shallow water flatfish species (Figure 22).

BYCATCH IN GROUNDFISH FISHERY

Information on the catch of prohibited species, non-commercial species or targeted species not retained comes from the National Marine Fisheries Service observer program. Vessels between 60′ and 125′ are required to carry observers 30% of their fishing time. Smaller vessels carry no observers and larger vessels have 100% coverage.

Prohibited species catch limits for halibut have been established and are allocated among gear types. Bycatch of halibut, salmon, crab and groundfish discards are reported weekly on the

National Marine Fisheries Service home page. Total incidental catch of salmon in 1996 was 20,000 fish through October 6 (Table 19). The bycatch of Tanner crab was estimated at 179,000 crabs and discarded groundfish species totaled over 33,000 mt.

SUMMARY

Groundfish fisheries in the Gulf of Alaska harvest nearly 500 million pounds of product each year. Significant groundfish stocks occur in state waters but catch and effort has varied widely by species.

Literature Cited

North Pacific Fishery Management Council. 1995. Stock Assessment and Fishery Evaluation Report for the groundfish resources of the Gulf of Alaska as Projected for 1996. Anchorage., Alaska.

North Pacific Fishery Management Council. 1995. Newsletter #5-95. Anchorage, Alaska.

North Pacific Fishery Management Council. 1994. Fishery Management Plan for the Gulf of Alaska Groundfish Fishery. Anchorage, Alaska.

Table 1. Pacific Cod harvest from the Central and Western Gulf, 1989-1996.

YEAR	NMFS AREA	VESSELS	LANDINGS	POUNDS*	% STATE WATERS
1989	CENTRAL	235	1455	59.5	7%
	WESTERN	137	598	31.0	25%
1990	CENTRAL	569	3064	91.0	13%
	WESTERN	153	951	84.7	15%
1991	CENTRAL	868	4248	100.5	19%
	WESTERN	273	1368	76.1	6%
1992	CENTRAL	1055	4985	89.1	18%
	WESTERN	281	1410	72.9	18%
1993	CENTRAL	660	3131	70.3	16%
	WESTERN	150	878	39.1	5%
1994	CENTRAL	462	2183	62.1	21%
	WESTERN	205	1073	32.2	23%
1995	CENTRAL	865	4228	95.9	23%
	WESTERN	244	1008	40.7	22%
1996**	CENTRAL			88.4	19%
	WESTERN			44.4	28%

*Total round pounds catch, all gear types

Source: ADF&G fish ticket database

**database through 10/23/96

Table 2. Pacific cod harvest from the state waters of the Central Gulf by Salmon Registration Area.

YEAR	HARVEST (millions)	*SALMON REGISTRATION AREA*		
		COOK INLET	KODIAK	CHIGNIK
1989	4.6	1%	85%	14%
1990	11.8	2%	95%	2%
1991	19.5	9%	69%	22%
1992	16.3	32%	55%	13%
1993	11.5	31%	61%	8%
1994	13.0	20%	79%	1%
1995	22.1	19%	78%	3%
1996**	16.5	28%	69%	3%
average 89-96		19%	72%	8%
average 94-96		22%	75%	2%

Source: ADF&G fish ticket database

**database through 10/23/96

Table 3. Pacific cod harvest from the state waters of the Western Gulf.

YEAR	HARVEST (millions)	ALASKA PENINSULA	EASTERN ALEUTIANS
1989	10.0	70%	30%
1990	15.3	77%	23%
1991	6.0	61%	39%
1992	13.5	93%	7%
1993	1.8	70%	30%
1994	6.8	89%	11%
1995	7.7	77%	23%
1996**	11.8	95%	5%
average 89-96		81%	19%

(Salmon Management Area M divided at Scotch Cap Light into Alaska Peninsula and Eastern Aleutians.)

**database through 10/23/96

Table 4. Percent of Gulfwide Pacific cod landings by the three principal gear categories.

YEAR	TRAWLS	LONGLINE	POTS
1987	69%	28%	3%
1988	82%	13%	5%
1989	90%	9%	1%
1990	78%	8%	8%
1991	75%	10%	15%
1992	68%	19%	13%
1993	67%	16%	17%
1994	66%	15%	19%
1995	60%	16%	24%

Source: For 1987-92,Pacific States Marine Fisheries Commission, for 1994-95, NMFS Alaska Regional Office.

Table 5. Percent of state waters cod harvest from the Central Gulf by gear type.

YEAR	TRAWLS	LONGLINE	POT
1988	40%	44%	15%
1989	44%	48%	8%
1990	19%	14%	66%
1991	11%	20%	68%
1992	35%	12%	52%
1993	8%	27%	65%
1994	8%	19%	72%
1995	21%	6%	73%

Table 6. Percent of state waters cod harvest from the Western Gulf by gear type.

YEAR	TRAWLS	LONGLINE	POT
1988	19%	64%	16%
1989	89%	8%	3%
1990	92%	5%	3%
1991	71%	7%	21%
1992	80%	10%	9%
1993	26%	16%	58%
1994	61%	1%	33%
1995	53%	1%	45%

Table 7. Pollock harvest from the Central and Western Gulf, 1989-1995.

YEAR	NMFS AREA	VESSELS	LANDINGS	POUNDS*	% STATE WATERS
1989	CENTRAL	117	672	117.5	13%
	WESTERN	30	61	28.9	0%
1990	CENTRAL	210	1423	154.1	4%
	WESTERN	80	231	23.2	4%
1991	CENTRAL	254	1359	111.7	13%
	WESTERN	120	353	77.7	2%
1992	CENTRAL	436	1880	147.6	5%
	WESTERN	173	530	39.0	15%
1993	CENTRAL	332	1753	196.3	14%
	WESTERN	93	511	45.3	25%
1994	CENTRAL	312	1609	176.0	38%
	WESTERN	97	449	47.7	32%
1995	CENTRAL	336	1175	75.4	12%
	WESTERN	161	502	65.9	34%

*Total round pounds catch (millions), all gear types
Source: ADF&G fish ticket database

Table 8. Pollock fishing periods in the Central and Western Gulf, 1996.

NMFS REPORTING AREA		
610	620	630
JAN. 1-28*	JAN. 1-29*	JAN 1-23* JAN 29-FEB. 1
JUNE 1 (12 hrs.)	JUNE 1 (12hrs.)	JUNE 1 (12hrs.)
SEPT. 1-19	SEPT. 1-19 OCT. 5-13	SEPT. 1-3

*TRAWL GEAR ALLOWED JAN. 20

Table 9. Pollock TAC specifications and harvest from the Central and and Western Gulf, 1996.

Area	TAC (mt)	Harvest (mt)
610	25,480	24,552
620	12,840	12,800 (approx.)
630	13,680	13,056

Table 10. Black rockfish harvest from the Central and Western Gulf, 1989-1995.

YEAR	NMFS AREA	VESSELS	LANDINGS	POUNDS*	% STATE WATERS
1989	CENTRAL	29	92	45,313	74%
	WESTERN	1	1	908	0%
1990	CENTRAL	19	47	67,324	6%
	WESTERN	1	1	7	100%
1991	CENTRAL	90	401	981,883	93%
	WESTERN	1	1	27	100%
1992	CENTRAL	112	286	566,768	79%
	WESTERN	0	0	--	
1993	CENTRAL	101	237	256,900	41%
	WESTERN	9	18	155	0%
1994	CENTRAL	105	344	462,809	46%
	WESTERN	0	0	--	
1995	CENTRAL	167	498	772,775	58%
	WESTERN	17	60	120,991	100%

*Total round pounds catch, all gear types Source: ADF&G fish ticket database

Table 11. Flatfish harvest in 1996 from the Central and Western Gulf.**

FISHERY	CENTRAL GOA	WESTERN GOA
Arrowtooth Flounder	16,116	1845
Deep Water Flatfish	1,842	17
Shallow Water Flatfish	6,967	269
Flathead Sole	1,645	664
Rex Sole	5,139	478
TOTALS	31,709	3273

**harvest in metric tons, through 10/5/96. Source: NMFS Home Page.

Table 12. Shallow Water Flatfish* harvest from the Central and Western Gulf, 1989-1995.

YEAR	NMFS AREA	VESSELS	LANDINGS	POUNDS**	% STATE WATERS
1989	CENTRAL	61	390	2.6	4%
	WESTERN	19	29	1.0	0%
1990	CENTRAL	118	784	8.5	3%
	WESTERN	44	126	1.1	10%
1991	CENTRAL	132	636	5.0	6%
	WESTERN	58	121	2.6	11%
1992	CENTRAL	156	814	11.3	9%
	WESTERN	61	149	4.0	66%
1993	CENTRAL	168	943	18.0	6%
	WESTERN	45	136	0.3	22%
1994	CENTRAL	182	848	7.1	7%
	WESTERN	39	92	0.2	1%
1995	CENTRAL	193	857	9.5	18%
	WESTERN	89	213	0.4	3%

*Shallow water flatfish complex: rock sole, yellowfin sole, starry flounder, butter sole, English sole, and Alaska plaice.

**Total round pounds in millions, all gear types Source: ADF&G fish ticket database

Table 13. Flathead sole harvest from the Central and Western Gulf, 1989-1995.

YEAR	NMFS AREA	VESSELS	LANDINGS	POUNDS*	% STATE WATERS
1989	CENTRAL	56	279	1.1	5%
	WESTERN	5	5	0.005	0%
1990	CENTRAL	85	440	2.6	26%
	WESTERN	29	43	0.1	23%
1991	CENTRAL	116	548	3.2	15%
	WESTERN	57	87	0.3	0%
1992	CENTRAL	142	613	4.2	8%
	WESTERN	57	102	0.3	5%
1993	CENTRAL	157	646	3.8	13%
	WESTERN	49	91	0.9	3%
1994	CENTRAL	151	583	3.5	5%
	WESTERN	53	123	0.5	1%
1995	CENTRAL	196	750	2.4	12%
	WESTERN	91	255	0.6	3%

*Total round pounds in millions, all gear types Source: ADF&G fish ticket database

Table 14. Sablefish harvest from the Central and Western Gulf, 1989-1995.

YEAR	NMFS AREA	VESSELS	LANDINGS	POUNDS*	% STATE WATERS
1989	CENTRAL	411	785	17.0	0%
	WESTERN	150	296	9.2	6%
1990	CENTRAL	480	887	15.0	1%
	WESTERN	87	149	3.8	1%
1991	CENTRAL	583	1217	16.6	2%
	WESTERN	152	193	3.4	0%
1992	CENTRAL	841	1664	15.8	2%
	WESTERN	165	276	4.9	2%
1993	CENTRAL	585	1188	14.7	1%
	WESTERN	49	64	0.8	0%
1994	CENTRAL	699	1344	10.2	1%
	WESTERN	34	45	0.4	2%
1995	CENTRAL	387	728	6.9	1%
	WESTERN	118	179	3.4	1%

*Total round pounds catch in millions, all gear types

Source: ADF&G fish ticket database

Table 15. Density of Pacific cod found in ADF&G trawl surveys since 1989*.

AREA**	1989	1990	1991	1992	1993	1994	1995
Kodiak	205.3	100.2	186.5	80.0	92.5	66.9	83.9
South Peninsula	231.1	152.7	not avail.	256.1	108.6	102.1	not avail.
Eastern Aleutians	not avail.	71.7	not avail.	not avail.	not avail.	185.0	90.8
Chignik	171.3	69.6	not avail.	120.7	117.4	63.9	118.5

*Pounds per nautical mile.

**tanner crab management area

Table 16. Density of Pollock found in ADF&G trawl surveys since 1989*.

AREA**	1989	1990	1991	1992	1993	1994	1995
Kodiak	646.9	319.7	518.4**	385.3	355.7	431.6	442.8
South Peninsula	774.7	518.7	not avail.	605.3	552.4	859.1	not avail.
Eastern Aleutians	not avail.	376.5	not avail.	not avail.	not avail.	418.9	460.5
Chignik	780.6	391.1	not avail.	639.1	753.5	648.5	579.8

*Pounds per nautical mile.

**tanner crab management area

Table 17. Groundfish harvest by vessel class by vessel class from the Central and Western Gulf of Alaska, 1993-1995.

FISHERY	TOTAL HARVEST (million pounds)	Percent of Harvest by Vessel Class		
		< 61'	61' - 125'	> 125'
Pacific cod (all gears)	334.0	45%	51%	4%
Pacific cod (trawl)	232.3	42%	53%	5%
Pacific cod (pots)	72.9	56%	43%	<1%
Pacific cod (longlines)	38.0	46%	53%	1%
Pacific cod (jigs)	0.9	97%	3%	-
Pollock	589.8	9%	81%	10%
Sablefish	55.2	51%	44%	5%
Shallow water flats	35.5	10%	88%	2%
Flathead sole	11.7	4%	79%	17%
Deep Water Flats	12.2	2%	95%	3%
Rex sole	11.5	1%	75%	24%

Table 18. Groundfish harvest by vessel class by vessel class from the state waters of the Central and Western Gulf of Alaska, 1993-1995.

FISHERY	TOTAL HARVEST (million pounds)	Percent of Harvest by Vessel Class		
		< 61'	61' - 125'	> 125'
Pacific cod (all gears)	62.8	70%	30%	
Pacific cod (trawl)	12.3	60%	39%	1%
Pacific cod (pots)	38.5	66%	34%	
Pacific cod (longlines)	10.2	93%	7%	
Pacific cod (jigs)	0.7	99%	1%	
Pollock	153.0	17%	81%	2%
Sablefish	0.4	39%	60%	1%
Shallow water flats	3.4	13%	86%	1%
Flathead sole	1.0	5%	93%	2%

Table 19. Bycatch in Gulf of Alaska Groundfish Fisheries, 1996*

Chinook Salmon (number)	14950	
Other Salmon (number)	5054	
Tanner crab (number)		
Trawl gear	108818	
Pot gear	70390	
Hook & line gear	114	
King Crab (number)		
Trawl gear	186	
Pot gear	11	
Halibut (metric tons)		
Trawl gear	2872	
Hook & line gear	1658	
Pot gear	93	
Discarded Groundfish (metric tons)		Percent of Total catch
Shoreside Processors	13282	10%
Mothership	122	4%
Catcher/Processor	19829	39%

*Through 10/06/96, National Marine Fisheries Service home page.

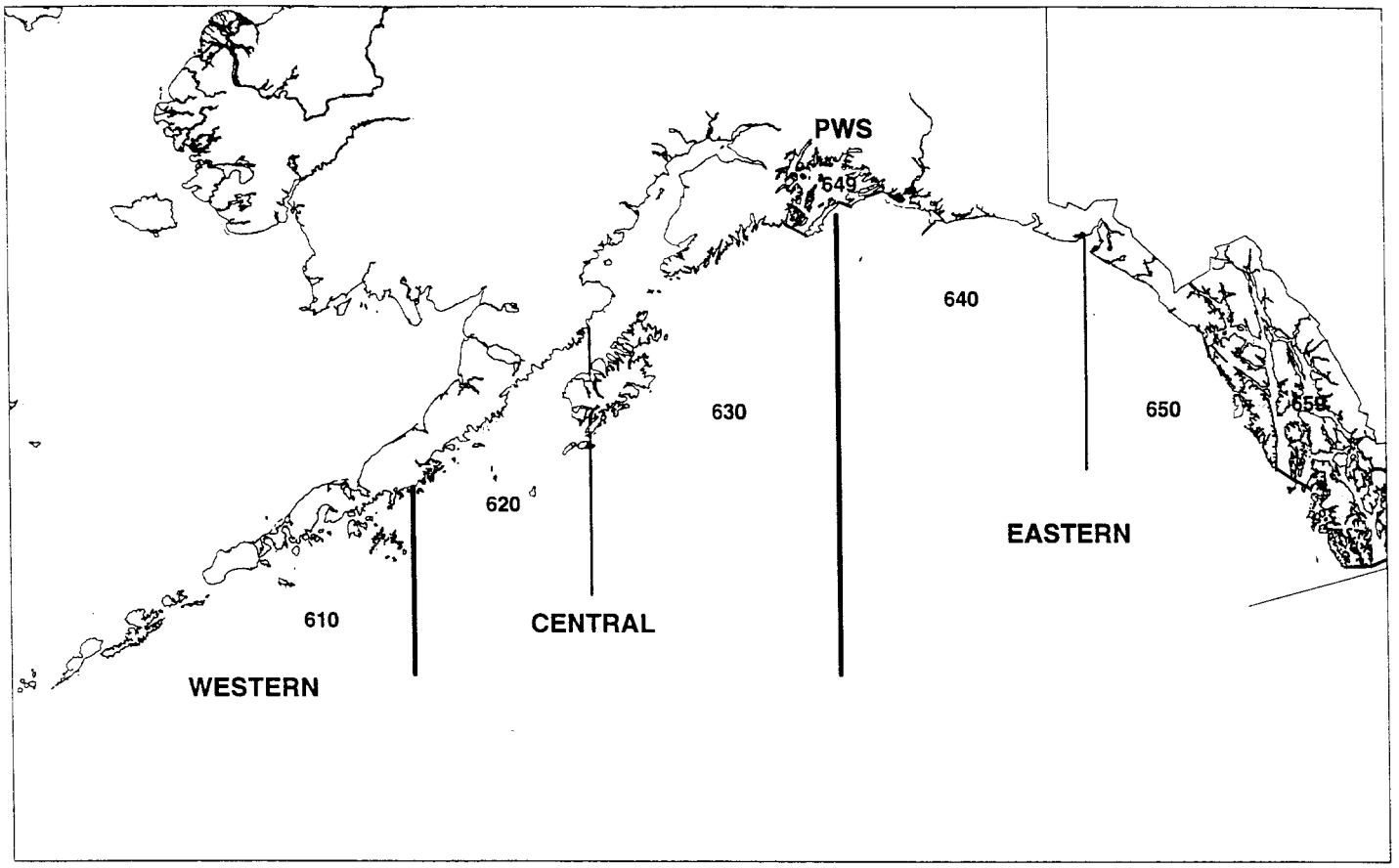


Figure 1. NMFS reporting areas in the Gulf of Alaska.

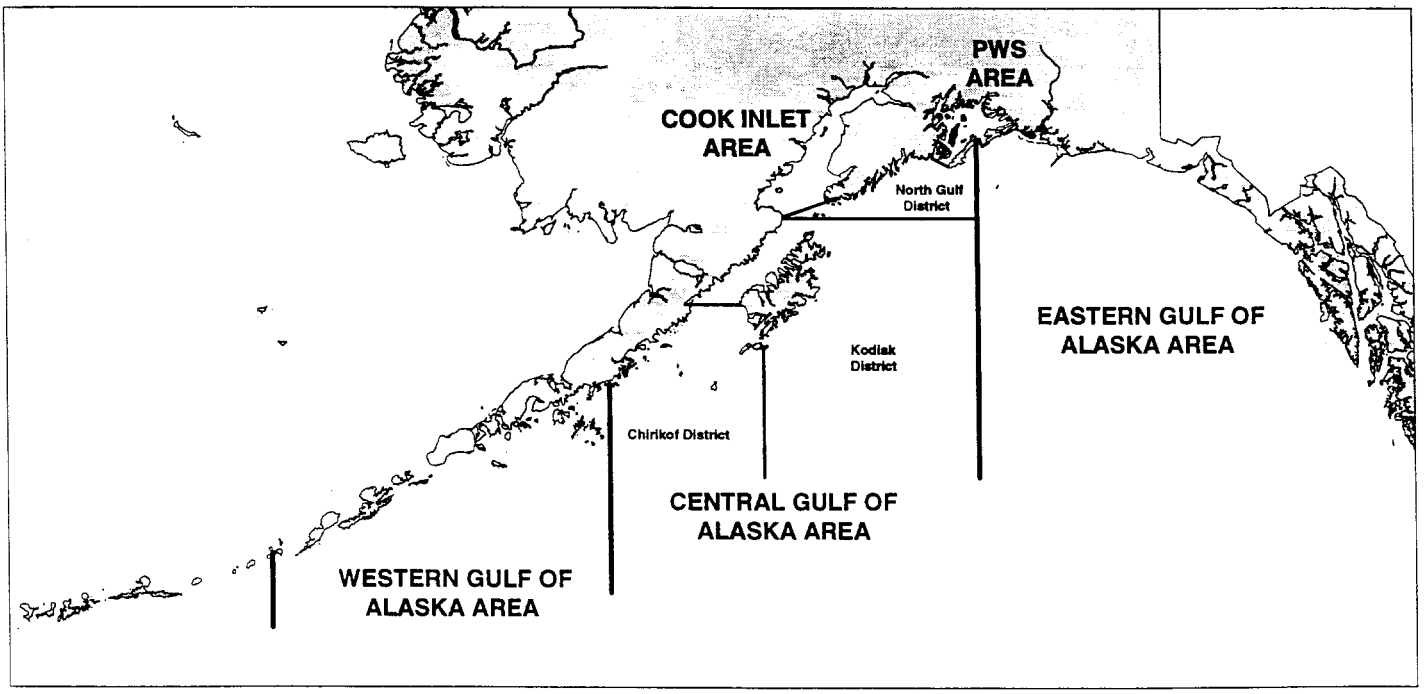


Figure 2. State of Alaska groundfish areas in the Gulf of Alaska.

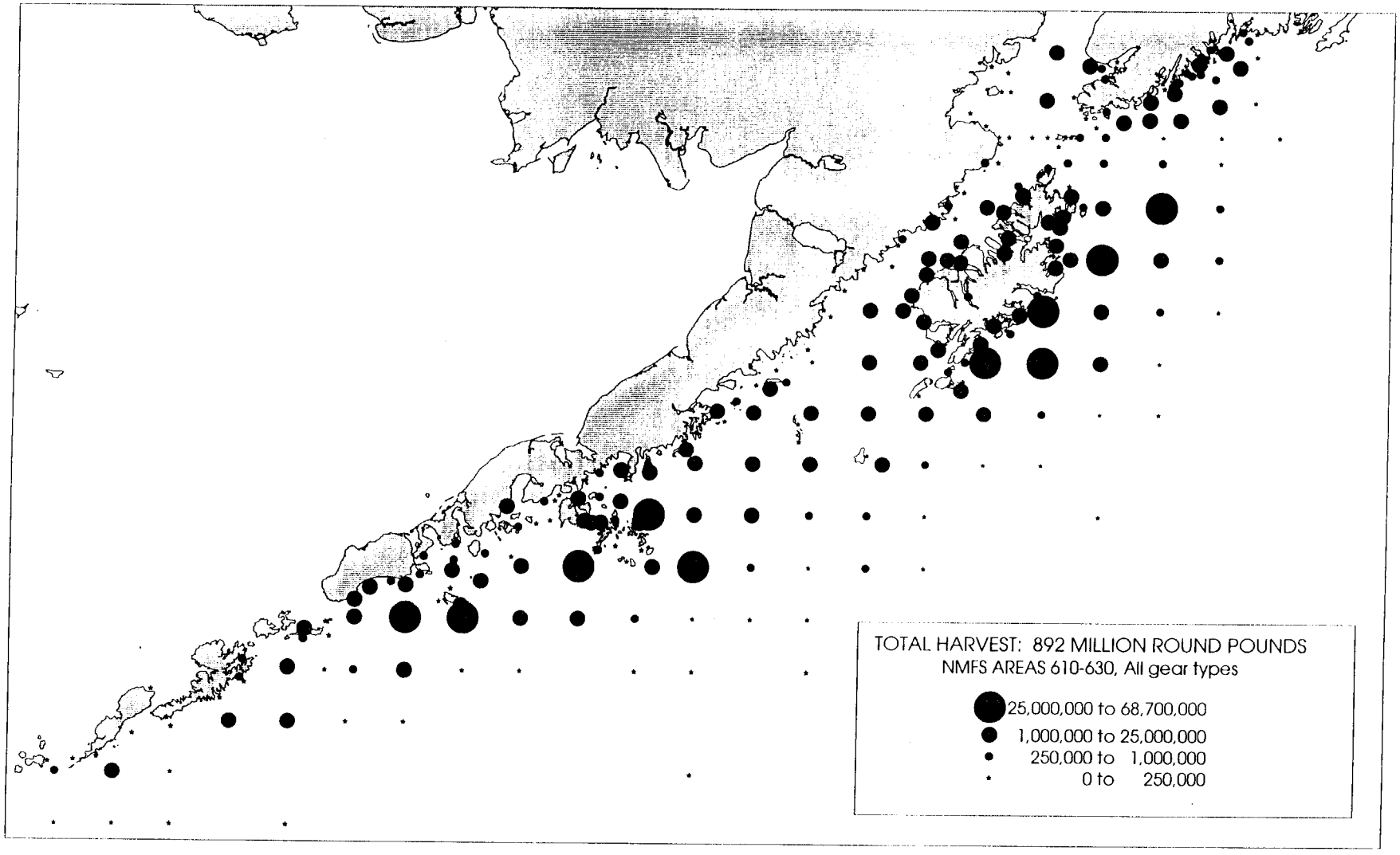


Figure 3. Historic catch of Pacific cod, 1990-1995, all gear types. Source: ADF&G fish ticket database.

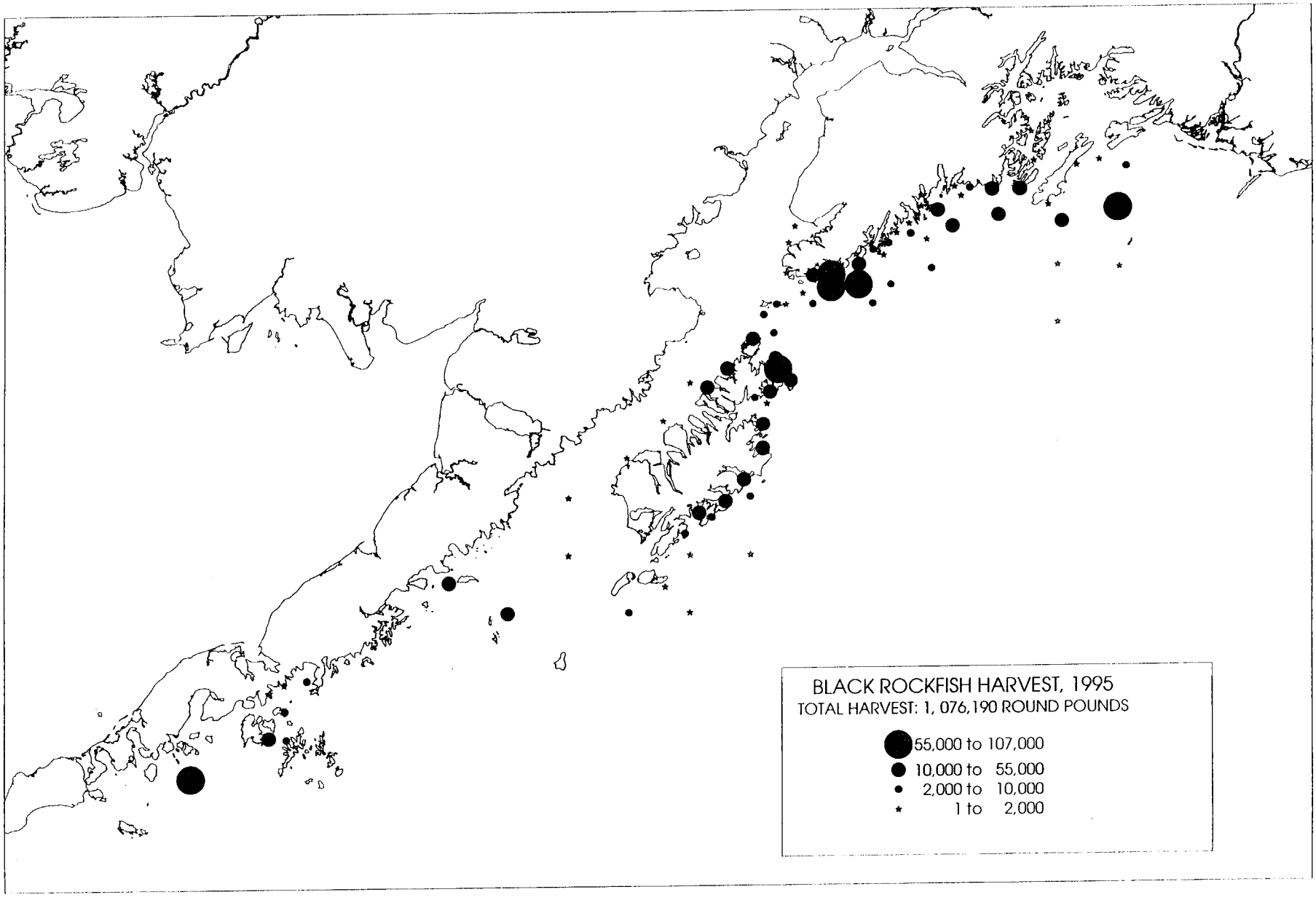


Figure 4. Black rockfish harvest in 1995 by statistical area.

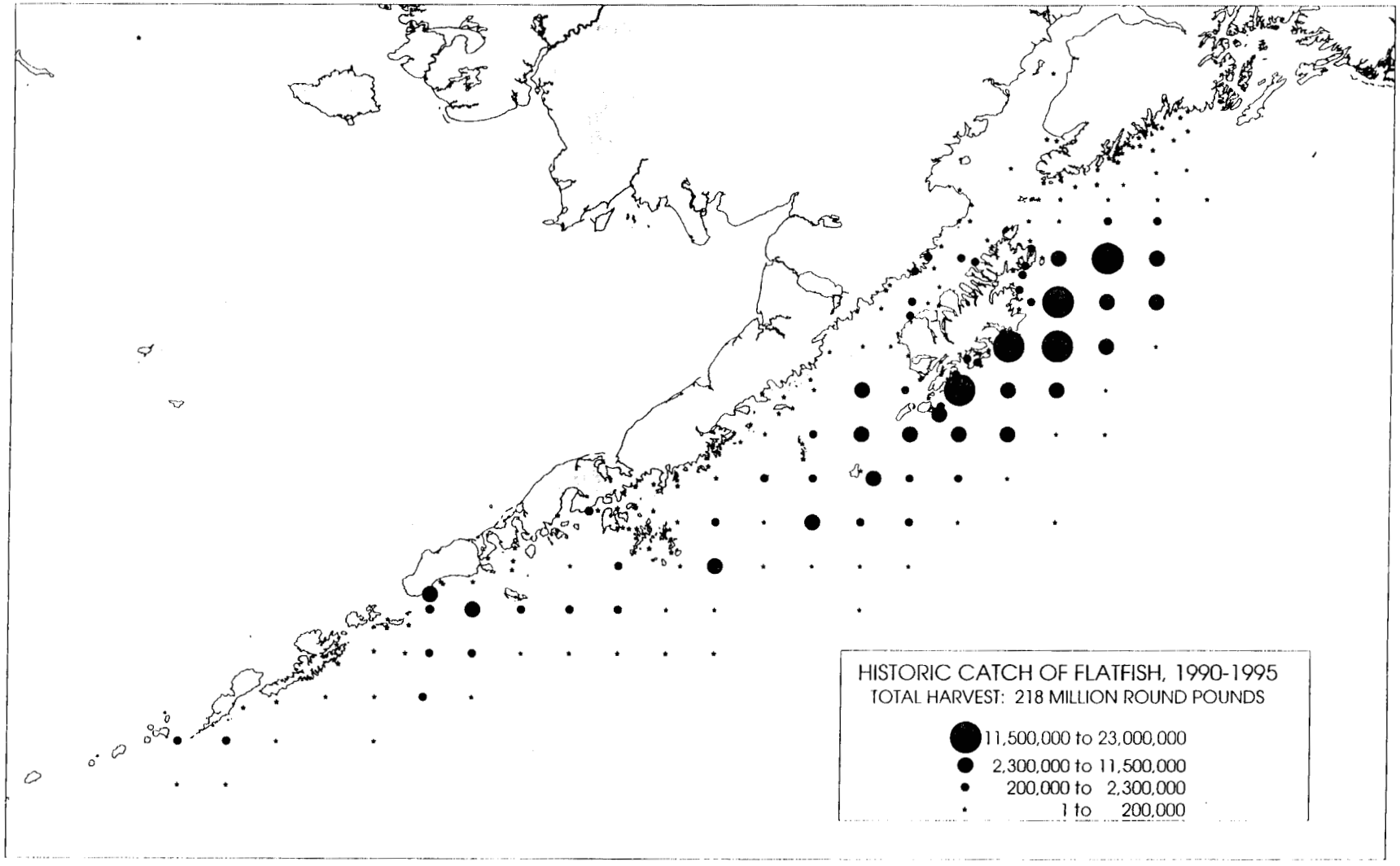


Figure 5. Historic catch of flatfish (rock sole, yellowfin sole, flathead sole, English sole, butter sole, rex sole, starry flounder, arrowtooth flounder, Alaska plaice) by statistical area, 1990-1995.

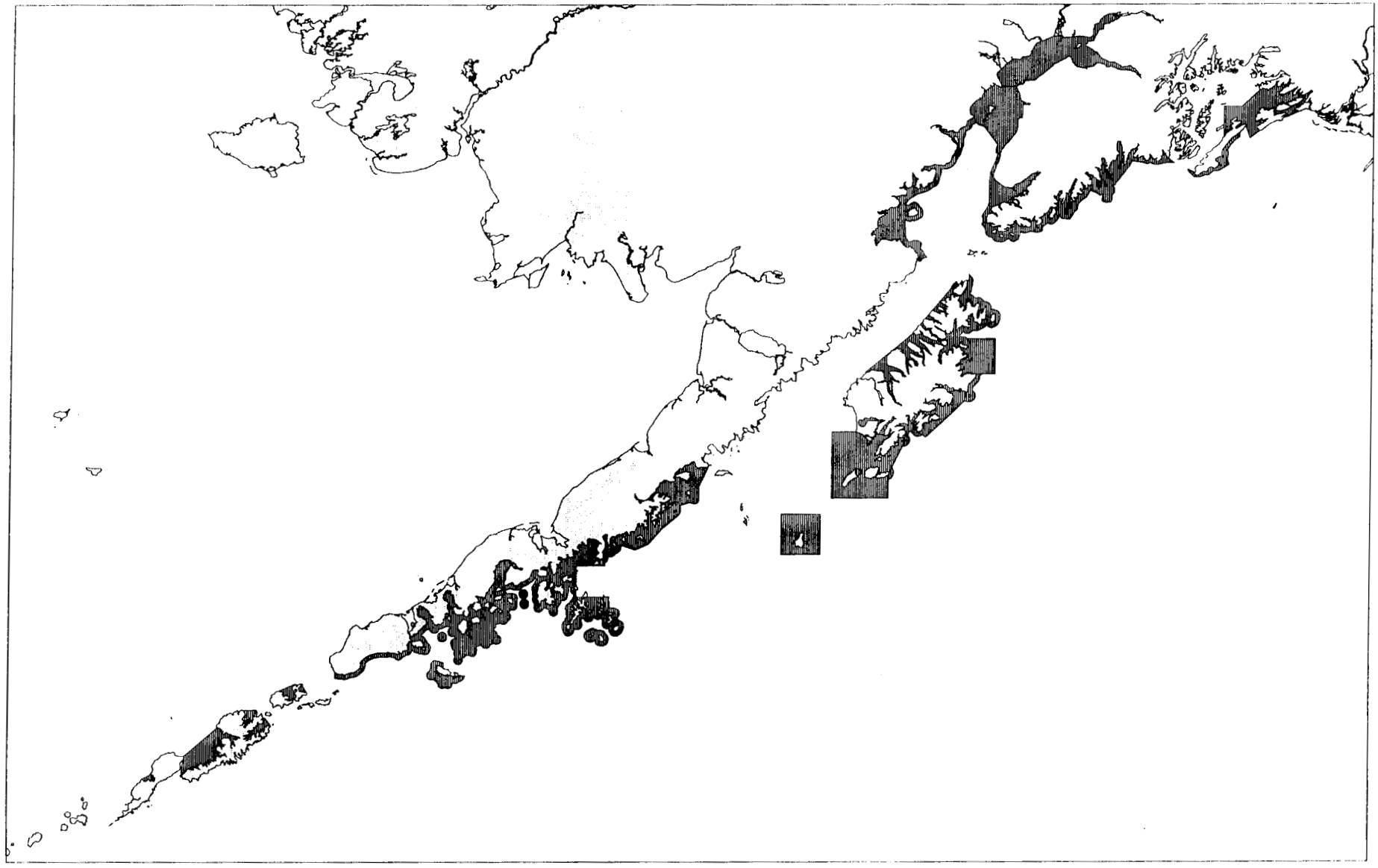


Figure 6. Areas of the Central and Western Gulf closed to non-pelagic trawling.

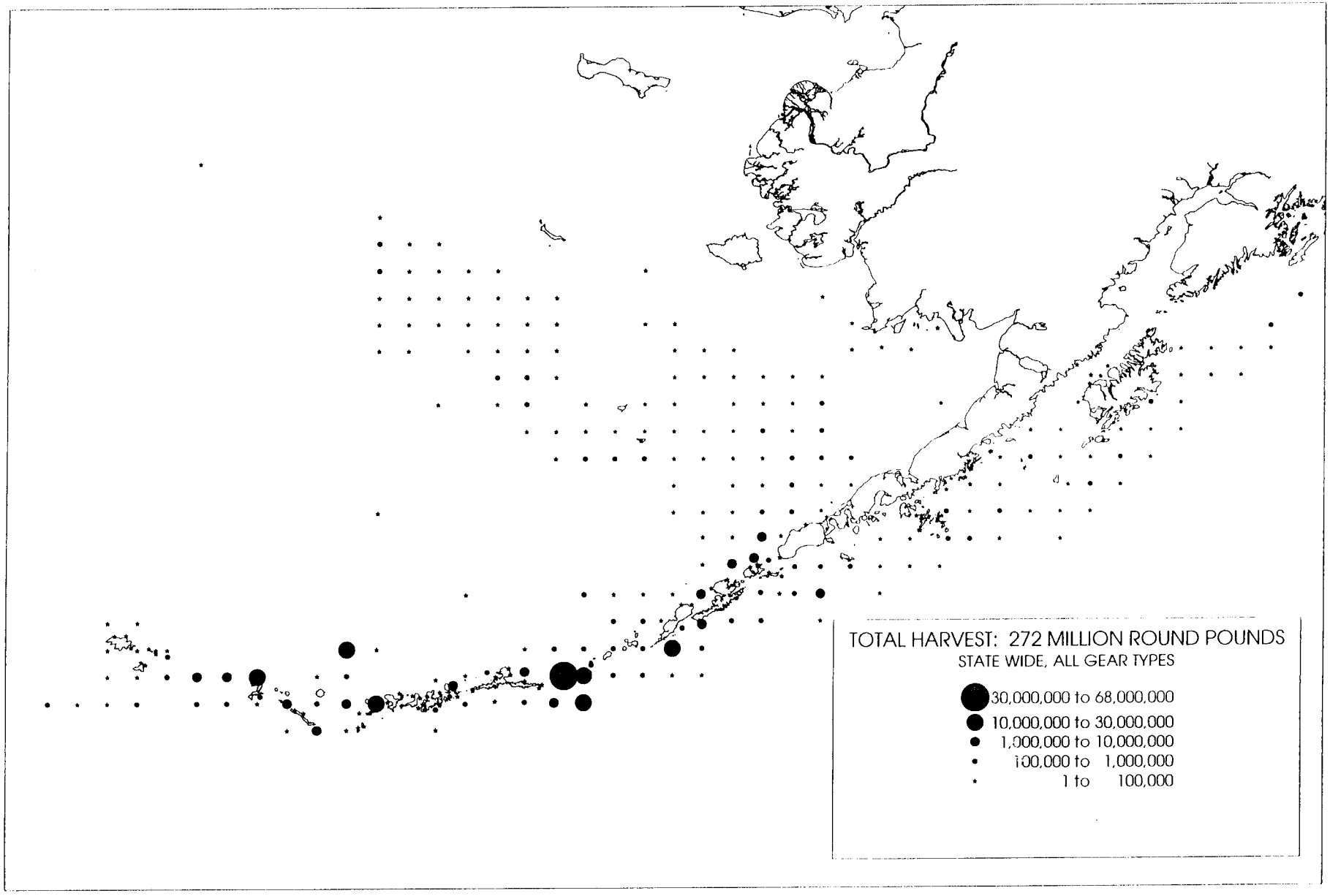


Figure 7. Historic catch of Atka mackerel, 1990-1995. Source: ADF&G fish ticket data base.

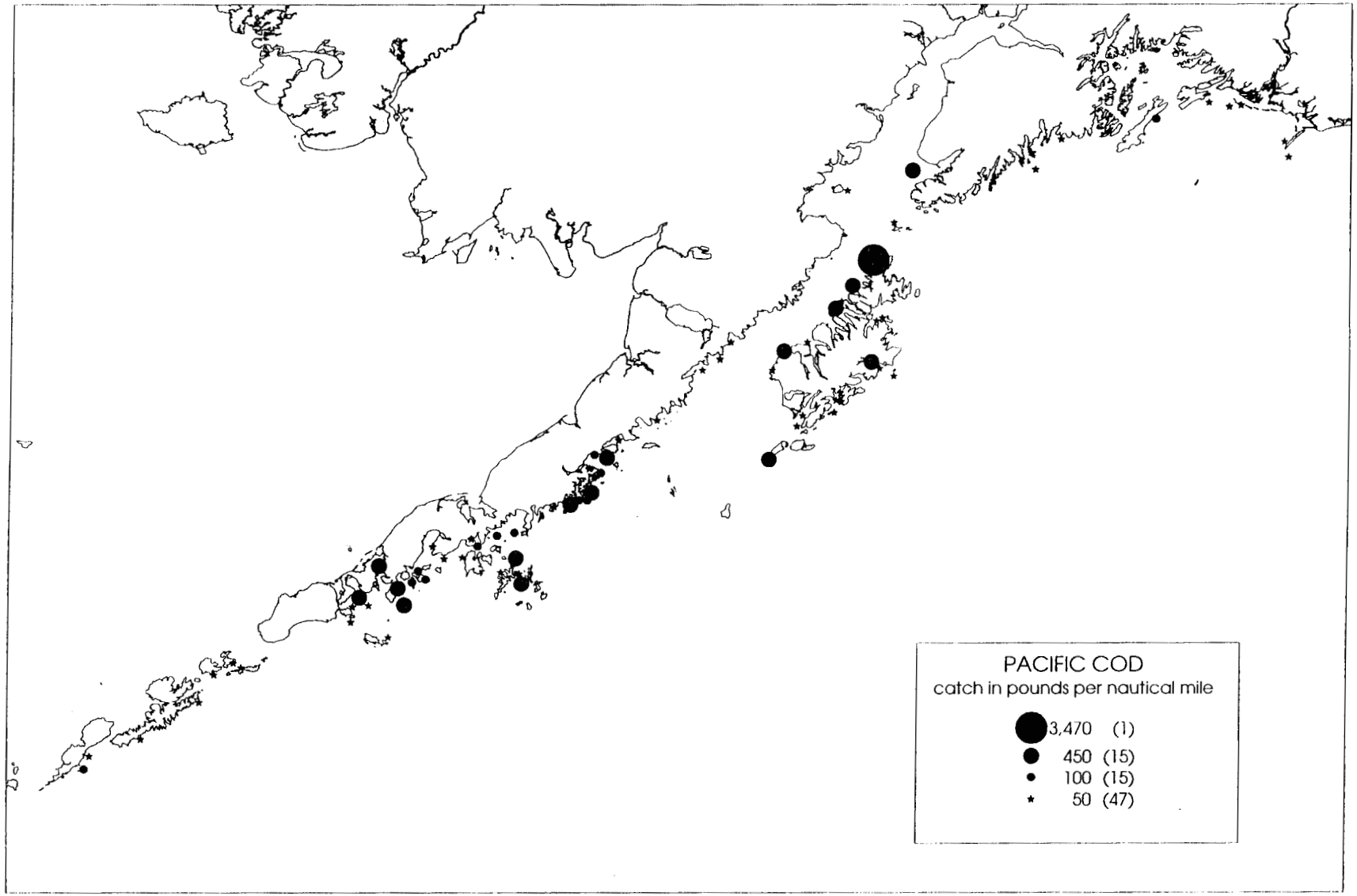


Figure 8. Density of Pacific cod captured from state waters in the 1993 NMFS triennial Gulf of Alaska trawl survey.

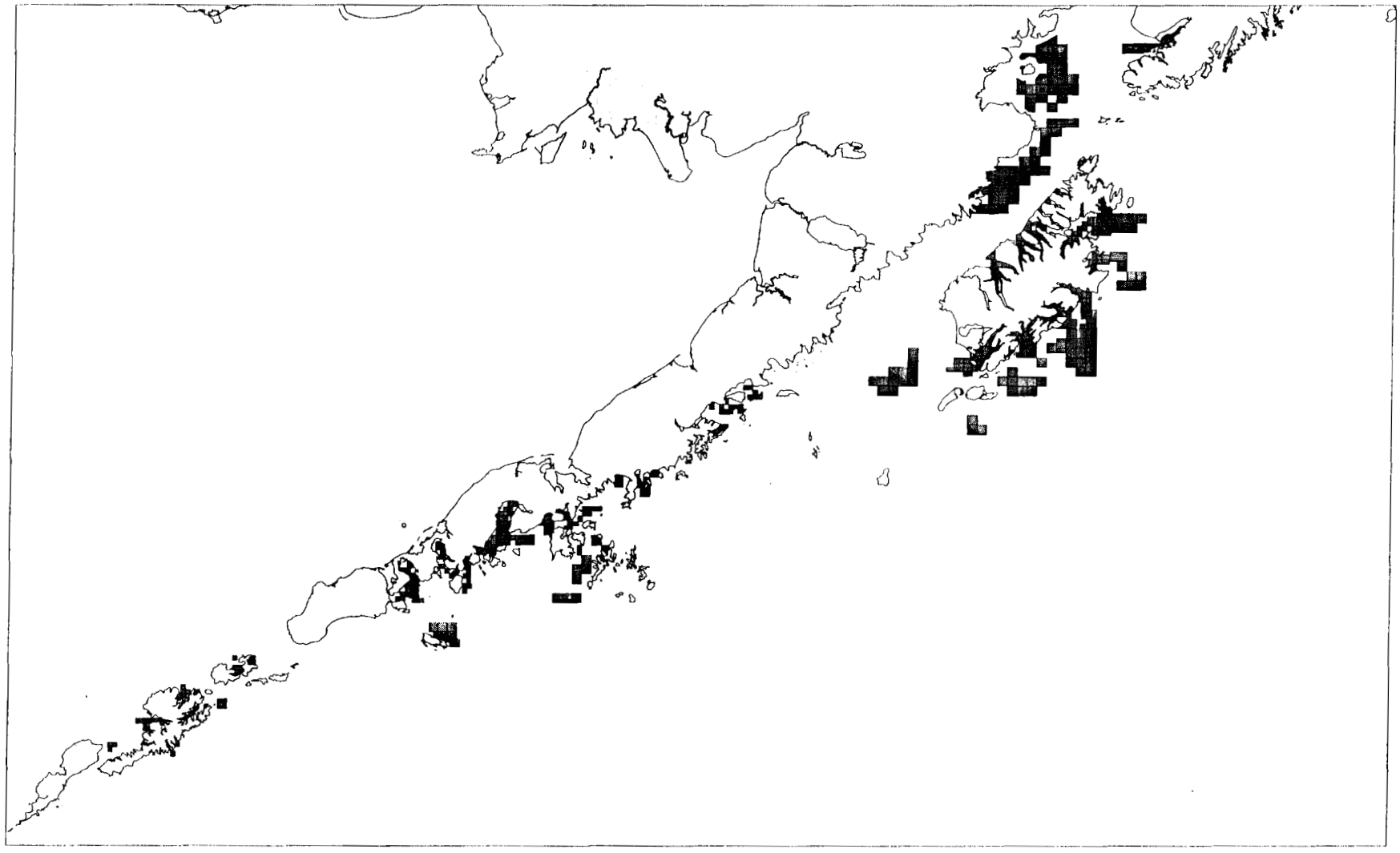


Figure 9. ADF&G trawl survey areas, 1996-1995.

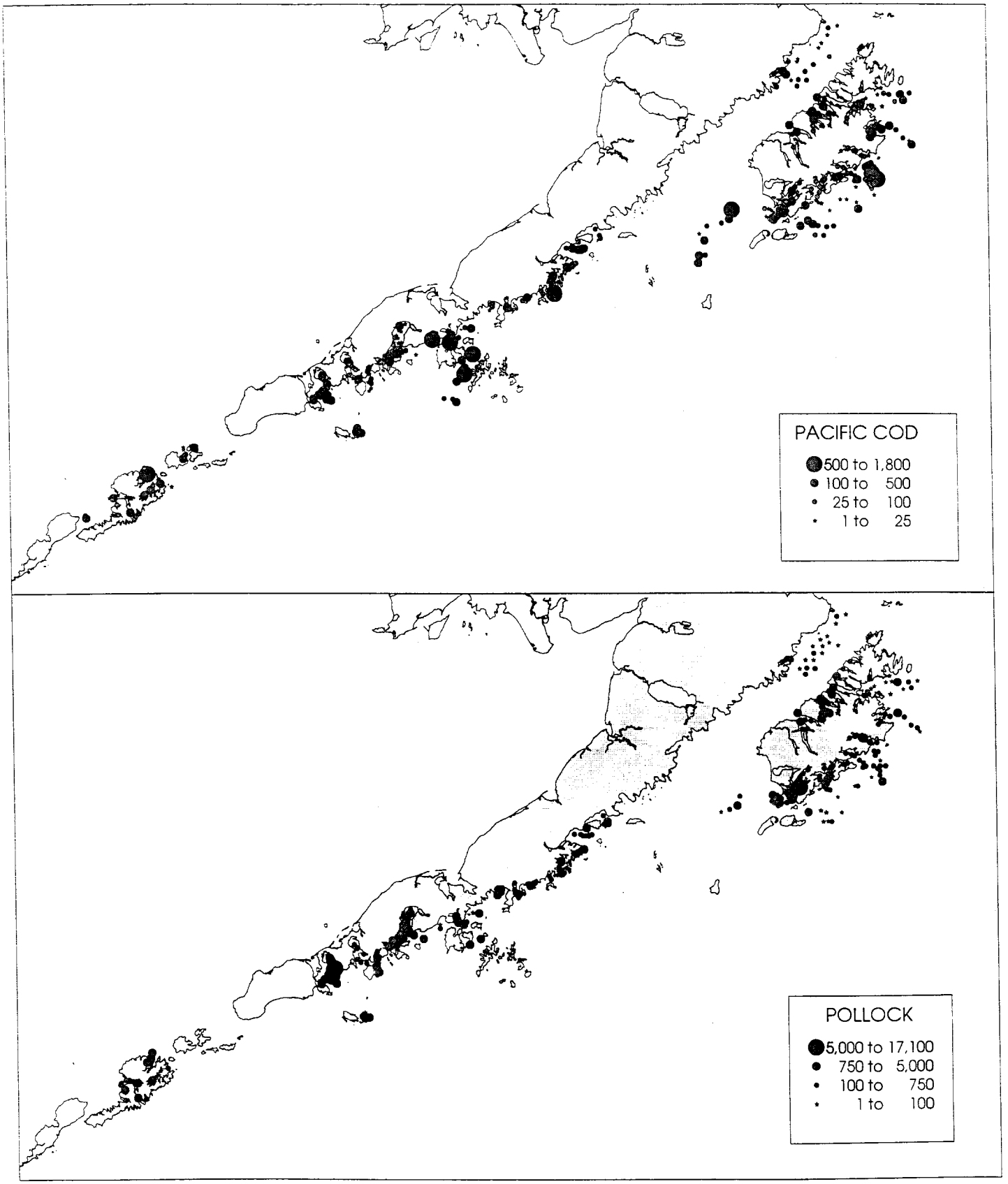


Figure 10. Density of Pacific cod and pollock in pounds per nautical mile from recent ADF&G trawl surveys.

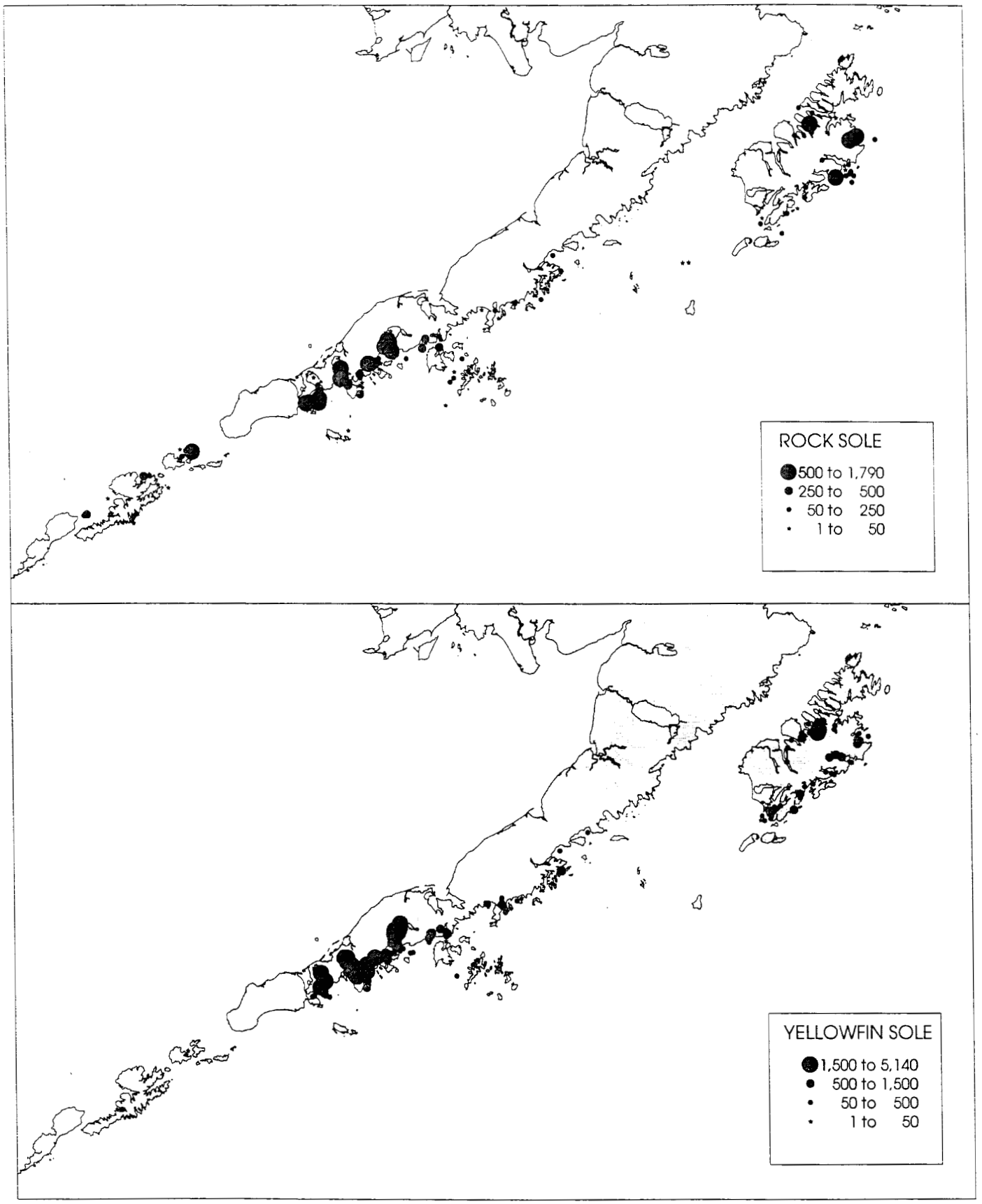


Figure 11. Density of rock sole and yellowfin sole in pounds per nautical mile from recent ADF&G trawl surveys.

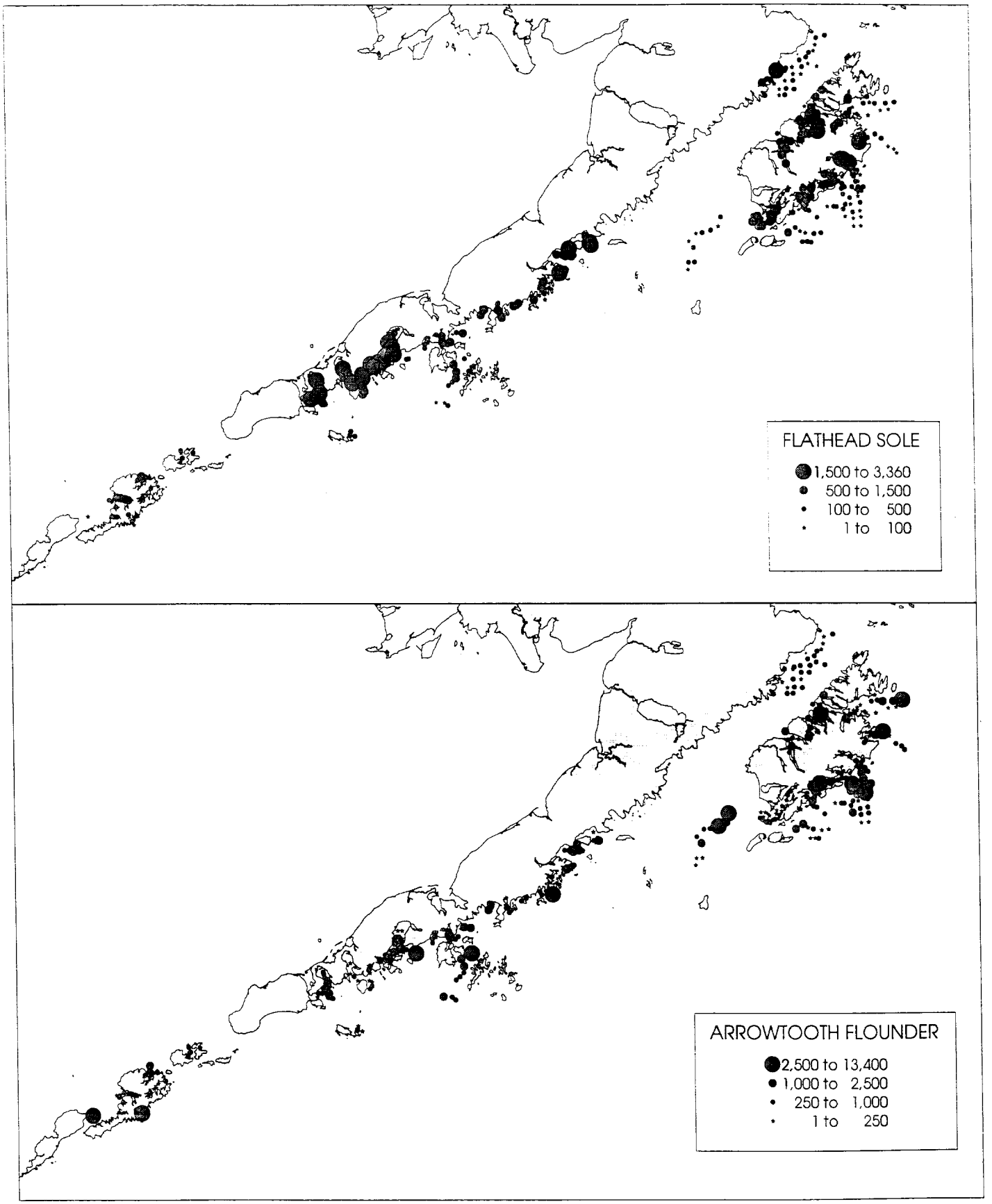


Figure 12. Density of flathead sole and arrowtooth flounder in pounds per nautical mile from recent ADF&G trawl surveys in the Gulf of Alaska.

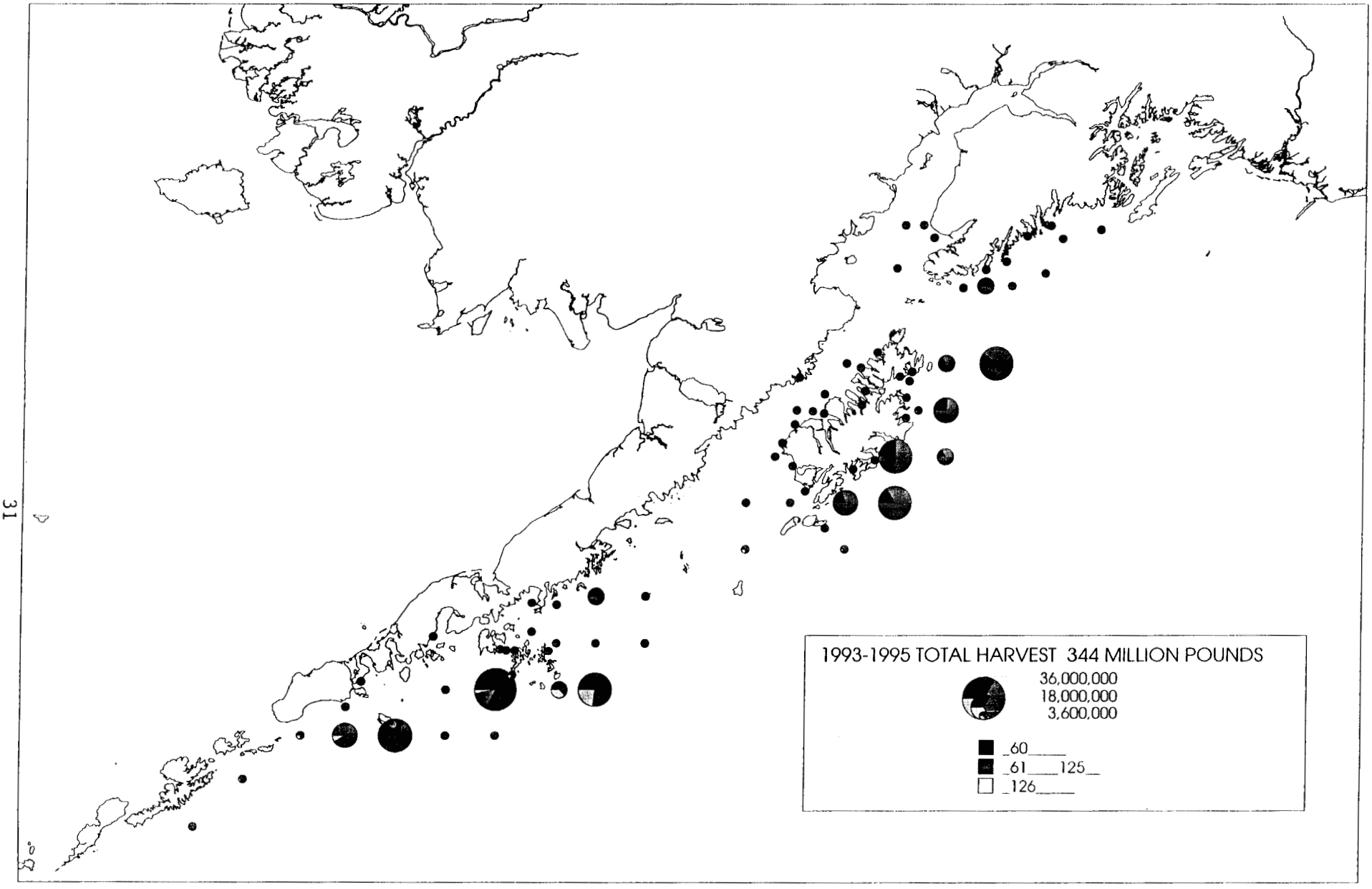


Figure 13. Pacific cod harvest by vessel class, 1993-1995.

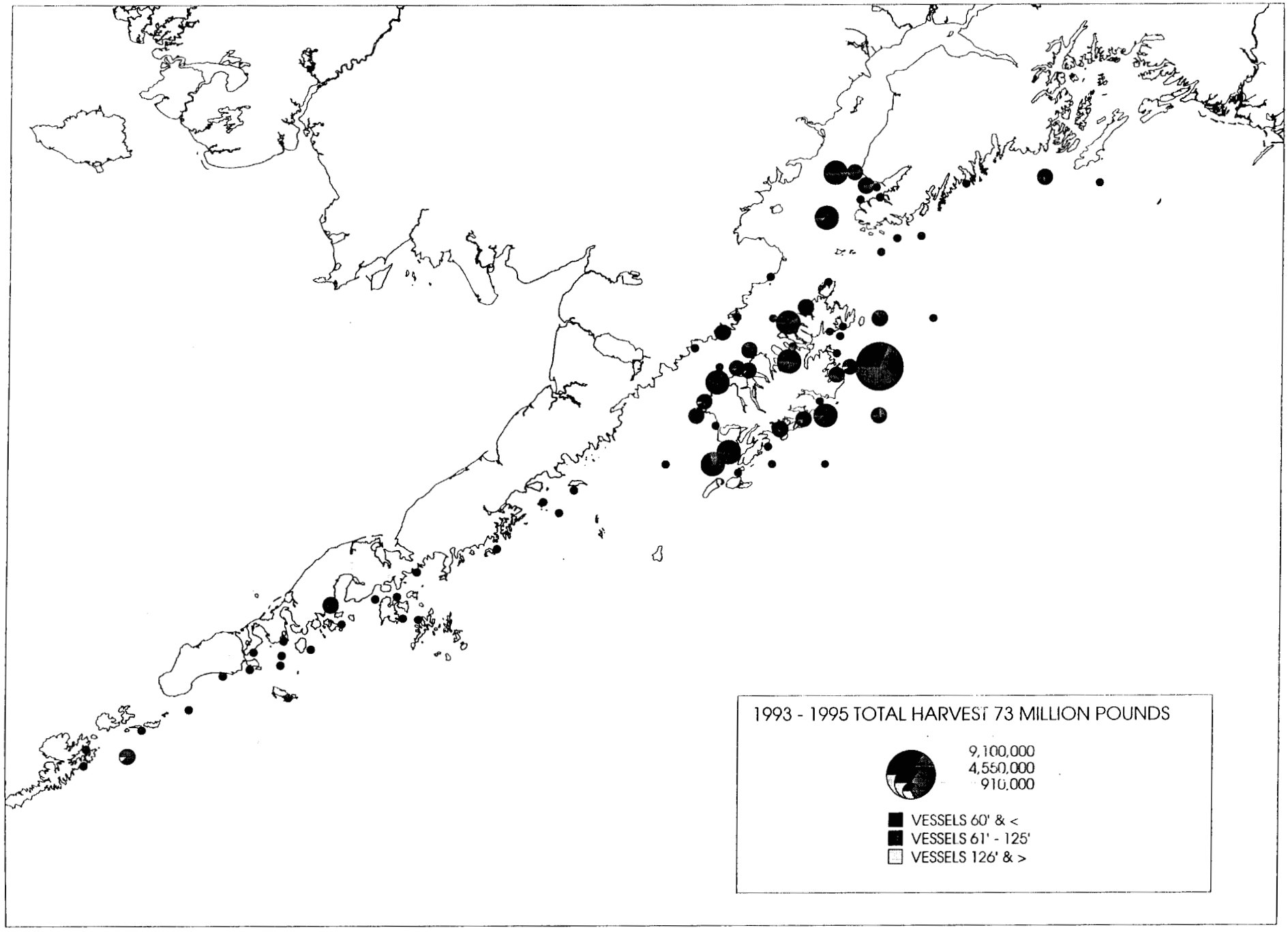


Figure 14. Pacific cod harvest with pot gear by vessel class, 1993-1995.

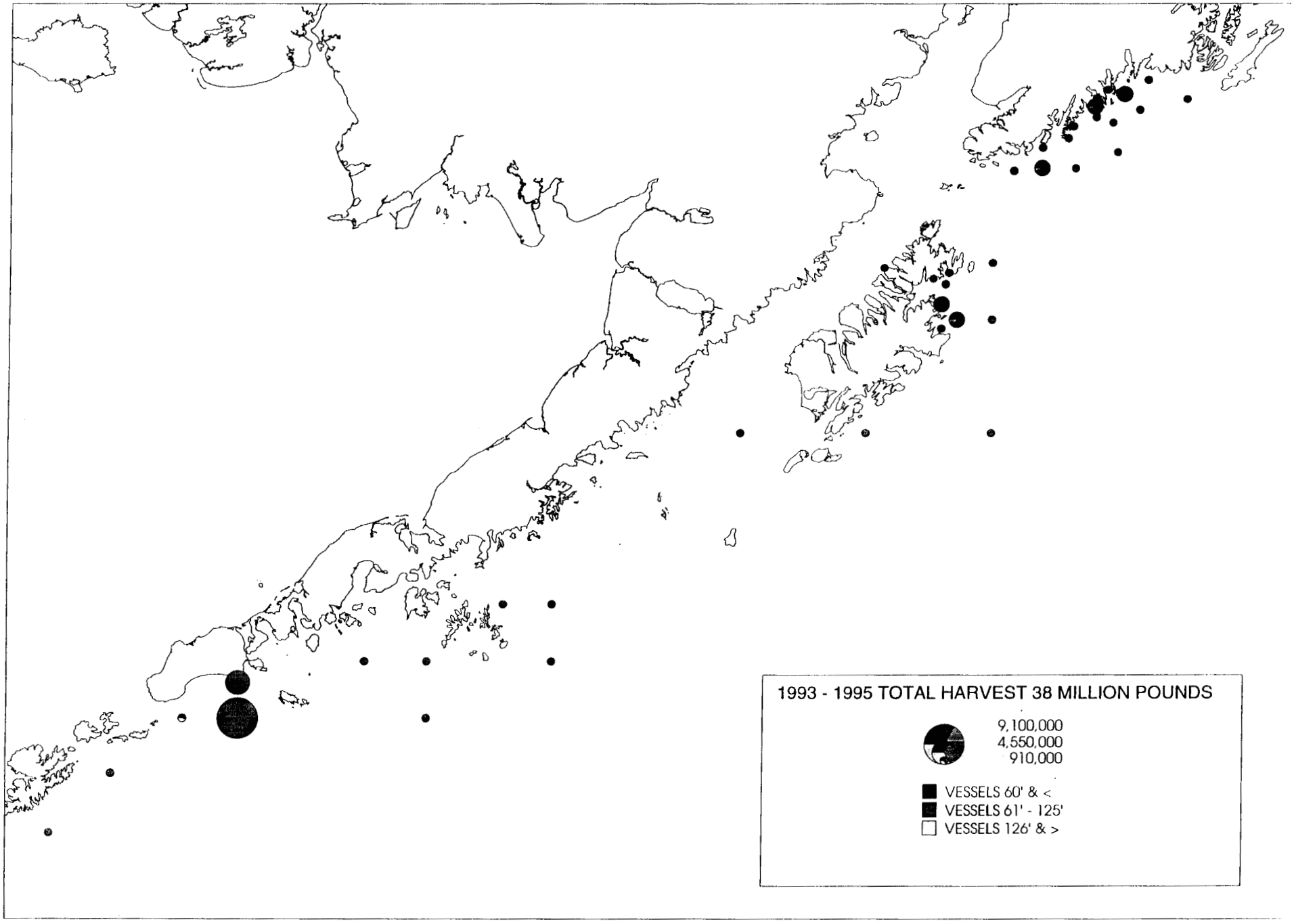


Figure 15. Pacific cod harvest with longline gear by vessel class, 1993-1995.

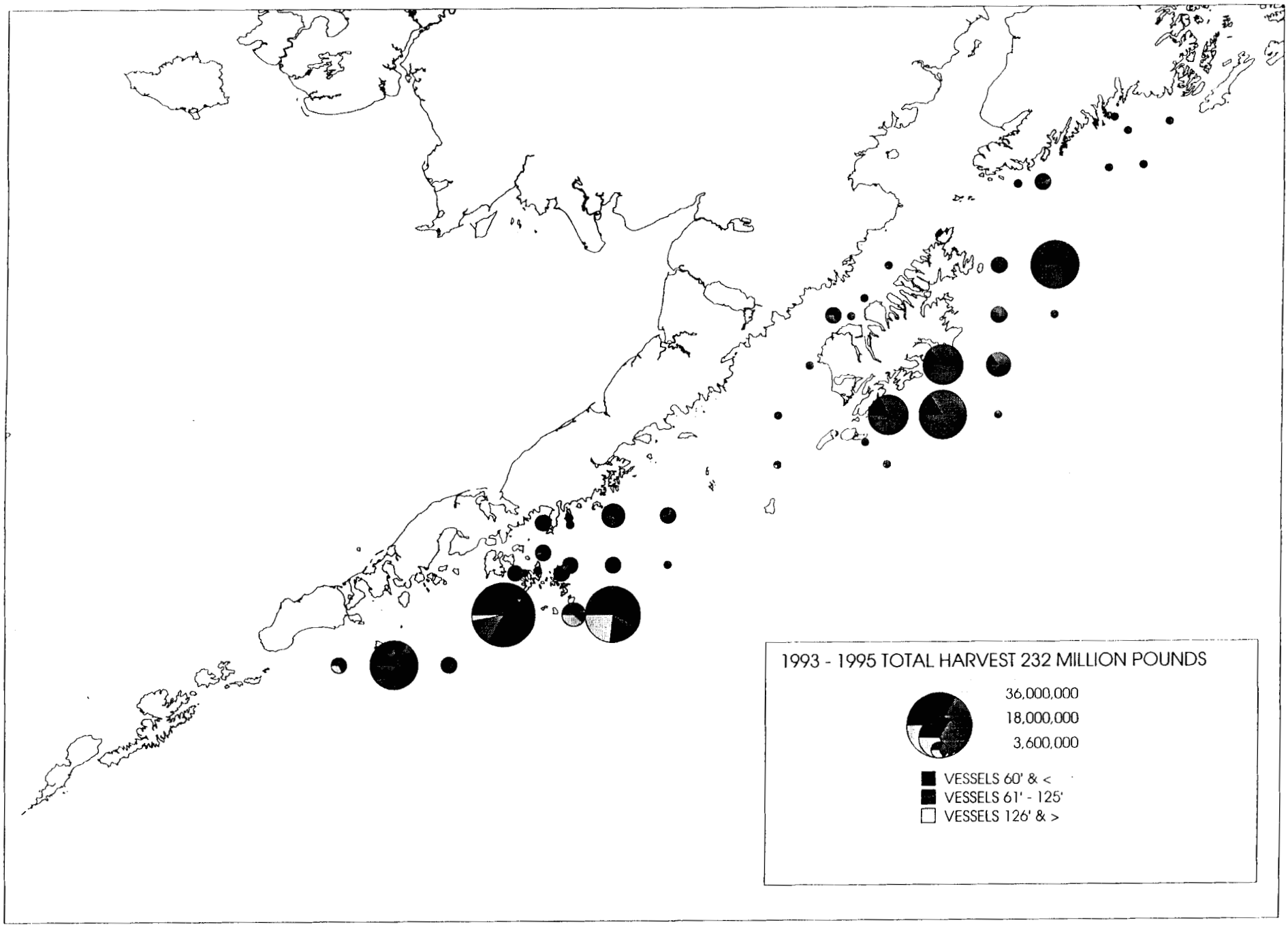


Figure 16. Pacific cod harvest with trawl gear by vessel class, 1993-1995.

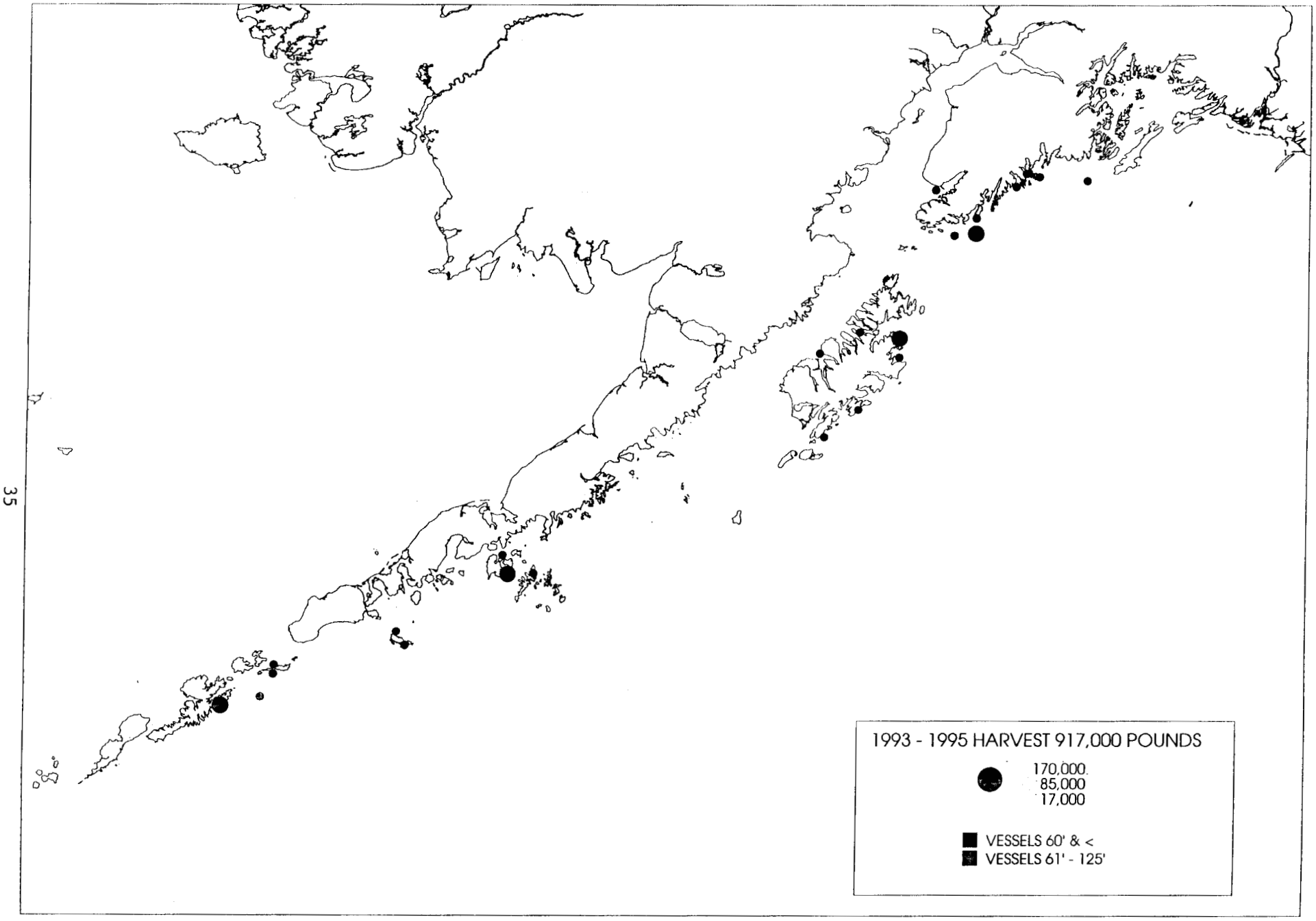


Figure 17. Pacific cod harvest with jig gear by vessel class, 1995-1993.

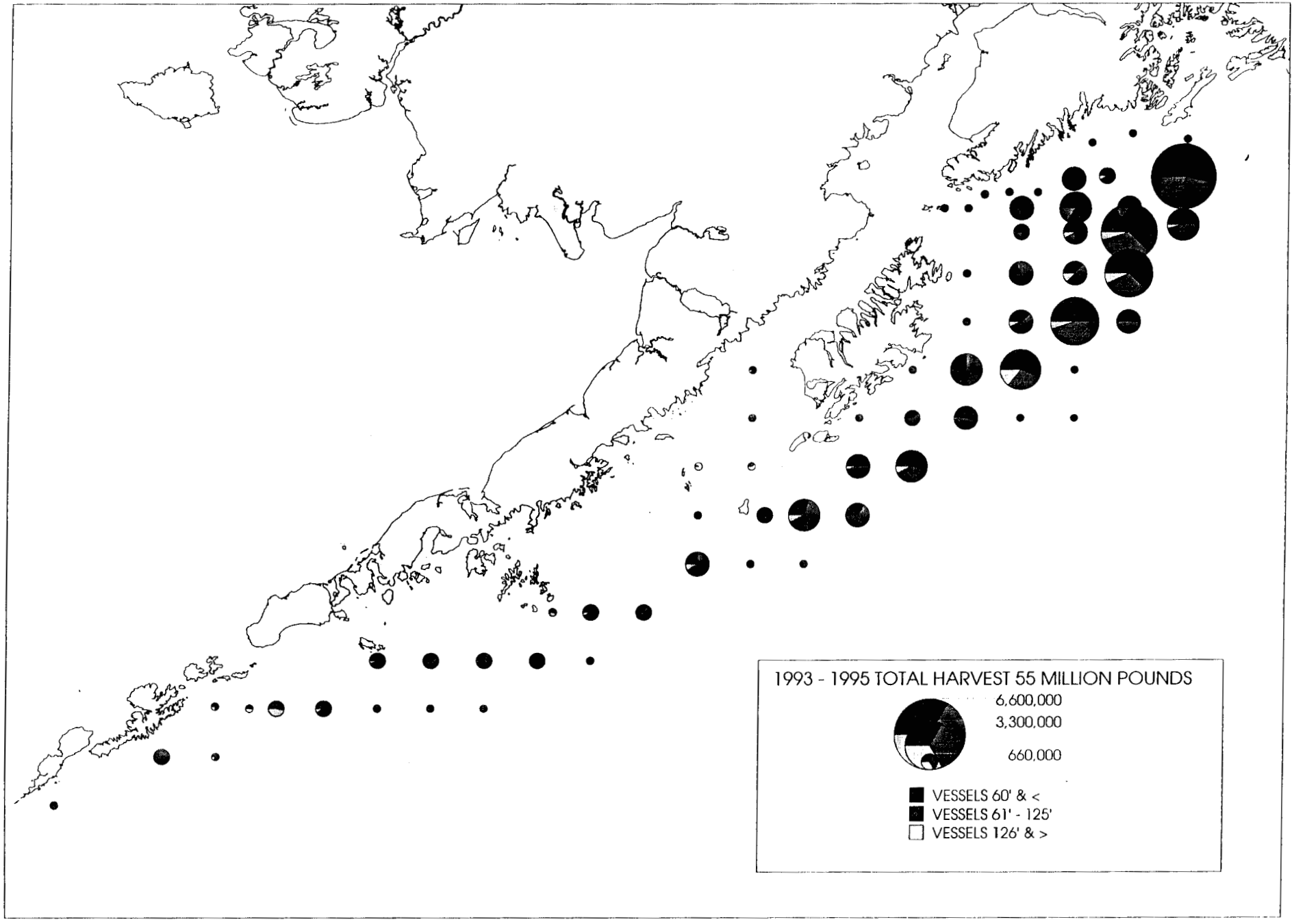
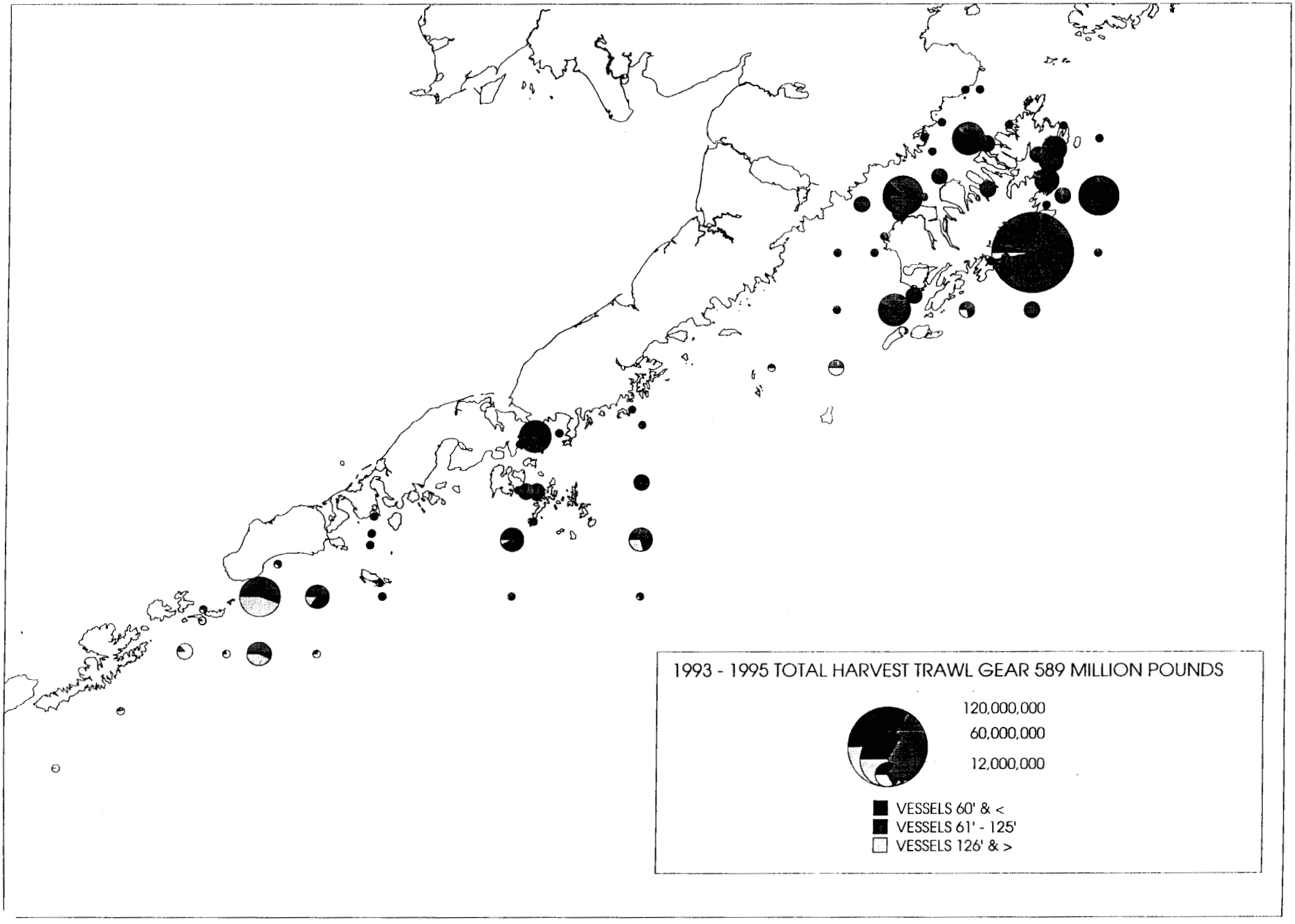


Figure 18. Sablefish harvest by vessel class, 1993-1995.



19. Pollock harvest with trawl gear by vessel class, 1993-1995.

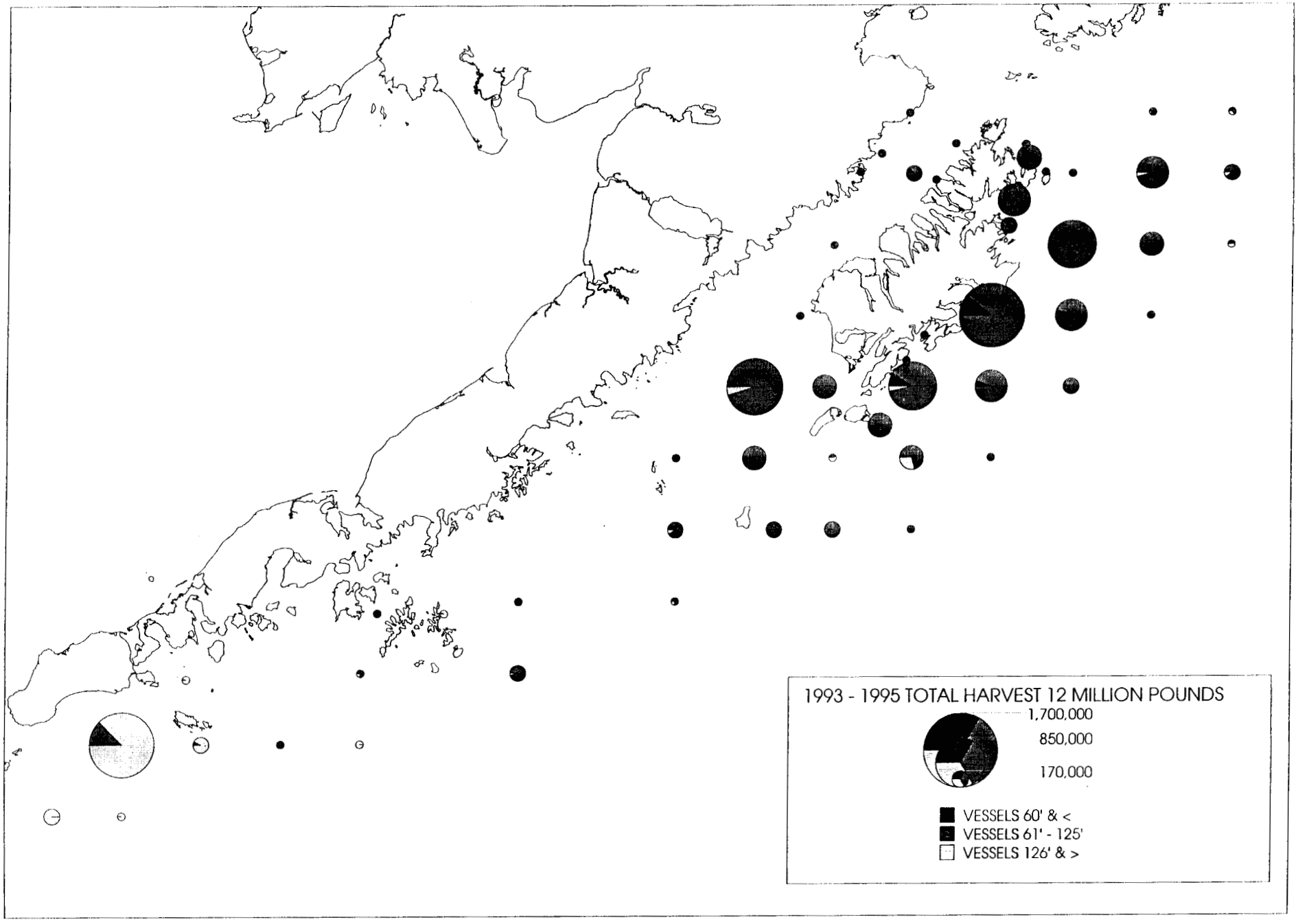


Figure 20. Flathead sole harvest with trawl gear by vessel class, 1993-1995.

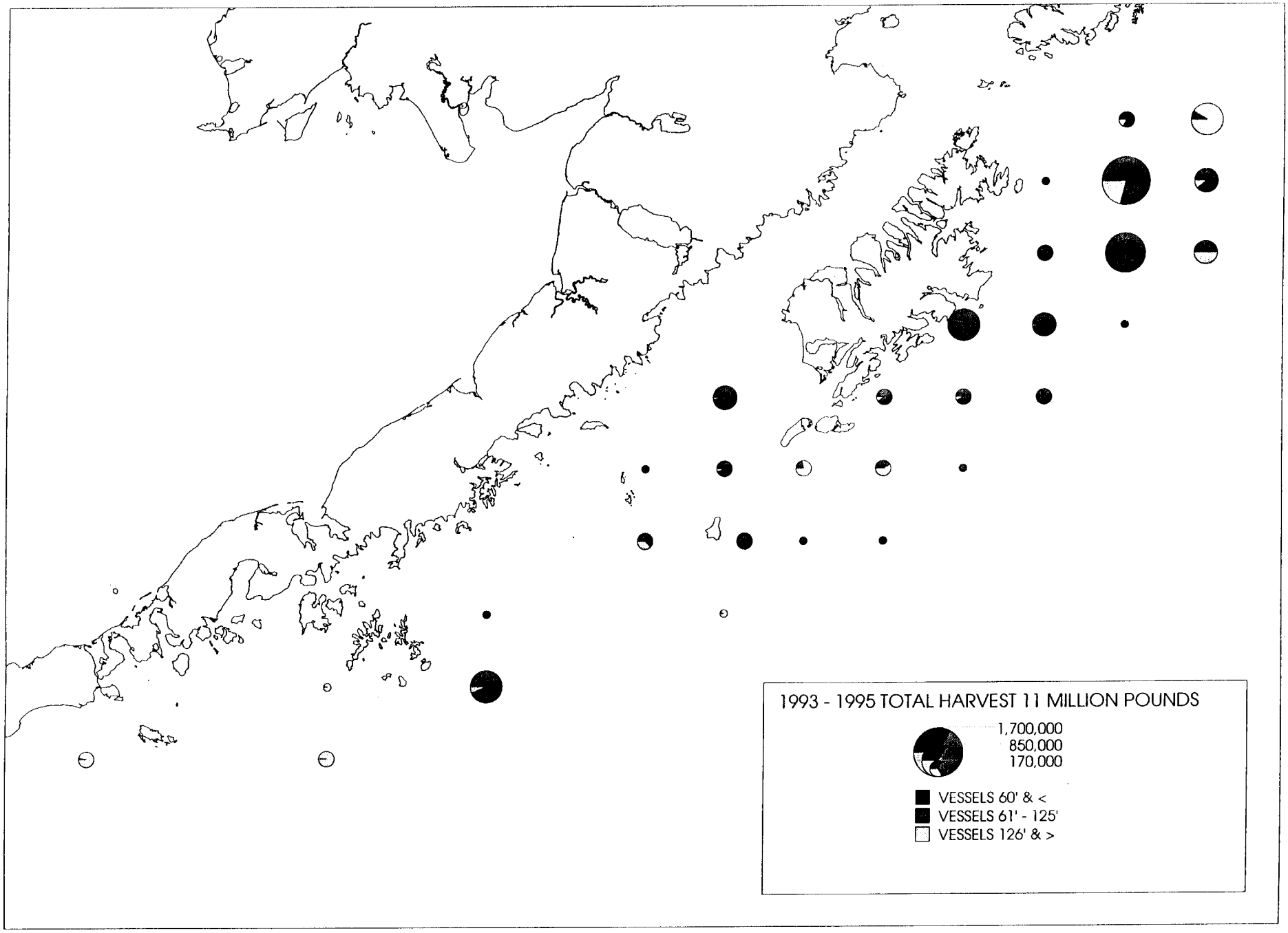


Figure 21. Rex sole harvest with trawl gear by vessel class, 1993-1995.

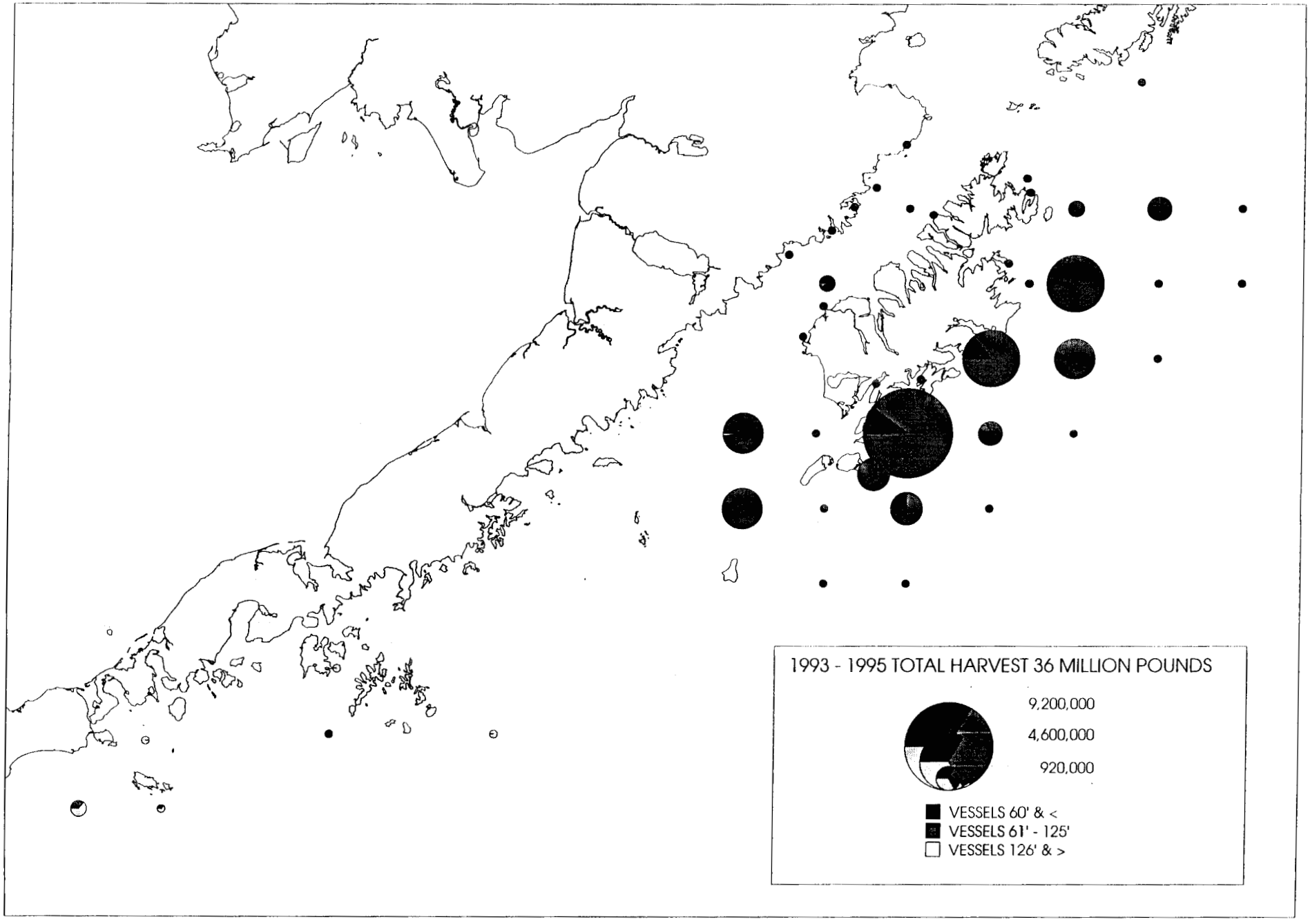


Figure 22. Shallow water flatfish (rock sole, yellowfin sole, starry flounder, butter sole, English sole, Alaska plaice) harvest by vessel class, 1993-1995.

Appendix 1. Groundfish landings (metric tons) in the Gulf of Alaska, 1956-1996. Source: NPFMC SAFE Report, September 1996.

Year	Pollock	Pacific Cod	Flat Fish	Sable Fish	Slope Rock Fish[a]
1956				1,391	
1957				2,759	
1958				797	
1959				1,101	
1960				2,142	
1961				897	16,000
1962				731	65,000
1963				2,809	136,300
1964	1,126	196	1,028	2,457	243,385
1965	2,749	599	4,727	3,458	348,598
1966	8,932	1,376	4,937	5,178	200,749
1967	6,276	2,225	4,552	6,143	120,010
1968	6,164	1,046	3,393	15,049	100,170
1969	17,553	1,335	2,630	19,376	72,439
1970	9,343	1,805	3,772	25,145	44,918
1971	9,458	523	2,370	25,630	77,777
1972	34,081	3,513	8,954	37,502	74,718
1973	36,836	5,963	20,013	28,693	52,973
1974	61,880	5,182	9,766	28,335	47,980
1975	59,512	6,745	5,532	26,095	44,131
1976	86,527	6,764	6,089	27,733	46,968
1977	112,089	2,267	16,722	17,140	23,453
1978	90,822	12,190	15,198	8,866	8,176
1979	98,508	14,904	13,928	10,350	9,921
1980	110,100	35,345	15,846	8,543	12,471
1981	139,168	36,131	14,864	9,917	12,184
1982	168,693	29,465	9,278	8,556	7,991
1983	215,567	36,540	12,662	9,002	7,405
1984	307,400	23,896	6,914	10,230	4,452
1985	284,823	14,428	3,078	12,479	1,087
1986	93,567	25,012	2,551	21,614	2,981
1987	69,536	32,939	9,925	26,325	4,981
1988	65,625	33,802	10,275	29,903	13,779
1989	78,220	43,293	11,111	29,842	19,002
1990	90,490	72,517	15,411	25,701	21,114
1991	107,500	76,997	20,068	19,580	13,994
1992	93,904	80,100	28,009	20,451	16,910
1993	108,591	55,994	37,853	22,671	14,240
1994	110,891	47,985	29,958	21,338	11,266
1995	73,248	69,053	32,273	18,631	15,023
1996[b]	24,590	66,875	34,416	13,324	14,050

1956						1,391
1957						2,759
1958						797
1959						1,101
1960						2,142
1961						16,897
1962						65,731
1963						139,109
1964						248,192
1965						360,131
1966						221,172
1967						139,206
1968						125,822
1969						113,333
1970						84,983
1971						115,758
1972						158,768
1973						144,478
1974						153,143
1975						142,015
1976						174,081
1977				0	19,455	4,642	195,768
1978				0	19,588	5,990	160,830
1979				0	10,949	4,115	162,675
1980				1,351	13,166	5,604	202,426
1981				1,340	18,727	7,145	239,476
1982			120	788	6,760	2,350	234,001
1983			176	730	12,260	2,646	296,988
1984			563	207	1,153	1,844	356,659
1985			489	81	1,848	2,343	320,656
1986			491	862	4	401	147,483
1987			778	1,965	1	253	146,703
1988	1,086		508	2,786	-	647	158,411
1989	1,739		431	3,055	-	1,560	188,253
1990	1,647		360	1,646	1,416	6,289	236,591
1991	2,342		323	2,018	3,258	1,577	247,657
1992	3,440		511	2,020	13,834	2,515	261,694
1993	3,193		558	1,369	5,146	6,867	256,482
1994	2,990	[f]	540	1,320	3,538	2,752	232,578
1995	2,891		219 [g]	1,113	701	3,433	216,585
1996	2,119		345	941	1,353	3,314	161,327

a/ Catch defined as follows: (1) 1961-78, Pacific ocean perch (S. alutus) only; (2) 1979-1987, the 5 species of the Pacific ocean perch complex; 1988-90, the 18 species of the slope rock assemblage; 1991-1995, the 20 species of the slope rockfish assemblage.

b/ Catch from Southeast Outside District.

c/ Thornyheads were included in the other species category, and are foreign catches only.

d/ After numerous changes, the other species category was stablized in 1981 to include sharks, skates, sculpins, eulachon, capelin (and other smelts in the family Osmeridae and octopus. Atka mackerel and squid were added in 1989. Catch of Atka Mackerel is reported separately for 1990-1992; thereafter Atka mackerel was assigned a seperate target species.

e/ Atka mackerel was added to the Other Species category in 1988.

f/ PSR includes light dusky rockfish, black rockfish, yellowtail rockfish, widow rockfish, dark dusky rockfish, and blue rockfish.

g/ Does not include at-sea discards.

h/ Catch data reported through August 10, 1996.

Appendix 2. Gulf of Alaska Groundfish ABCs and TACs

Final 1996 North Pacific Fishery Management Council Specifications (mt)						
		1995			COUNCIL	COUNCIL
Species	Area	ABC	TAC	Catch*	1996 ABC	1996 TAC
Pollock	W (61)	30,380	30,380	30,221	25,480	25,480
	C (62)	15,310	15,310	12,895	12,840	12,840
	C (63)	16,310	16,310	24,661	13,680	13,680
	E	3,360	3,360	3,464	2,810	2,810
	Total	65,360	65,360	71,241	54,810	54,810
Pacific Cod	W	20,100	20,100	22,247	18,850	18,850
	C	45,650	45,650	44,654	42,900	42,900
	E	3,450	3,450	1,172	3,250	3,250
	Total	69,200	69,200	68,073	65,000	65,000
Flatfish, Deep Water	W	670	460	96	670	460
	C	8,150	7,500	1,894	8,150	7,500
	E	5,770	3,120	221	5,770	3,120
	Total	14,590	11,080	2,211	14,590	11,080
Rex Sole	W	1,350	800	220	1,350	800
	C	7,050	7,050	3,633	7,050	7,050
	E	2,810	1,840	174	2,810	1,840
	Total	11,210	9,690	4,027	11,210	9,690
Flathead Sole	W	8,880	2000	587	8,880	2000
	C	17,170	5000	1,558	17,170	5000
	E	2,740	2740	29	2,740	2740
	Total	28,790	9,740	2,174	28,790	9,740
Flatfish, Shallow Water	W	26,280	4,500	359	26,280	4,500
	C	23,140	12,950	5,065	23,140	12,950
	E	2,850	1,180	7	2,850	1,180
	Total	52,270	18,630	5,431	52,270	18,630
Arrowtooth	W	28,400	5,000	1,416	28,400	5,000
	C	141,290	25,000	15,469	141,290	25,000
	E	28,440	5,000	928	28,440	5,000
	Total	198,130	35,000	17,813	198,130	35,000
Sablefish	W	2,600	2,600	1,665	2,200	2,200
	C	8,600	8,600	7,313	6,900	6,900
	W. Yakutat	4,100	4,100	3,779	3,040	3,040
	E. Yak./SEO	6,200	6,200	5,149	4,940	4,940
	Total	21,500	21,500	17,906	17,080	17,080
Pacific Ocean Perch	W	1,180	1,014	1,422	1,460	1,260
	C	3,130	2,702	2,665	3,860	3,333
	E	2,220	1,914	1,707	2,740	2,366
	Total	6,530	5,630	5,794	8,060	rebuilding plan 6,959
Shortraker/Rougheye	W	170	170	210	170	170
	C	1,210	1,210	1,250	1,210	1,210
	E	530	530	833	530	530
	Total	1,910	1,910	2,293	1,910	1,910
Rockfish, Other Slope	W	180	57	31	180	100
	C	1,170	368	928	1,170	1,170
	E	5,760	1,810	521	5,760	750
	Total	7,110	2,235	1,480	7,110	2,020
Rockfish, Northern	W	640	640	112	640	640
	C	4,610	4,610	5,530	4,610	4,610
	E	20	20	47	20	20
	Total	5,270	5,270	5,689	5,270	5,270
Rockfish, Pelagic Shelf	W	910	910	107	910	910
	C	3,200	3,200	2,282	3,200	3,200
	E	1,080	1,080	584	1,080	1,080
	Total	5,190	5,190	2,973	5,190	5,190
Rockfish, Demersal Shelf	SEO	580	580	180	950	950
Thornyhead	Gulfwide	1,900	1,900	1,107	1,560	1,248
Atka Mackerel	W		2,310	326		2,310
	C		925	368		925
	E		5	2		5
	Total	3,240	3,240	696	3,240	3,240
Other Species	Gulfwide	NA	13,308	3,608	NA	12,040
GULF OF ALASKA	TOTAL	492,780	279,463	223,796	475,170	259,867

* Catch through October 28, 1995